PUBLIC LIBRARY
FEB 16 1943
DETROIT

PROCEEDINGS

OF THE

American Philosophical Society

Held at Philadelphia for Promoting Useful Knowledge

VOLUME 86, NUMBER 2 FEBRUARY 10, 1943

RECENT ADVANCES IN AMERICAN ARCHAEOLOGY

Papers read before
The American Philosophical Society
Annual Meeting
April 23, 24, 25, 1942

PHILADELPHIA
THE AMERICAN PHILOSOPHICAL SOCIETY
INDEPENDENCE SQUARE
1943

COMMITTEE ON PUBLICATIONS

JACOB R. SCHRAMM, *Chairman*

FRANKLIN EDGERTON	ERNEST M. PATTERSON
LUTHER P. EISENHART	CONYERS READ
WILLIAM E. LINGELBACH	ADOLPH H. SCHULTZ
FOREST R. MOULTON	T. LESLIE SHEAR
ARTHUR D. NOCK	GEORGE G. SIMPSON

HAROLD C. UREY

EDITORIAL BOARD

Editor-in-Chief	WILLIAM E. LINGELBACH
Editor—Class I	KARL K. DARROW
Editor—Class II	MERKEL H. JACOBS
Editor—Class III	ERNEST M. PATTERSON
Editor—Class IV	RHYS CARPENTER

LANCASTER PRESS, INC., LANCASTER, PA.

RECENT ADVANCES IN AMERICAN ARCHAEOLOGY

Papers read before

The American Philosophical Society

Annual Meeting

April 23, 24, 25, 1943

PHILADELPHIA

THE AMERICAN PHILOSOPHICAL SOCIETY

INDEPENDENCE SQUARE

1943

CONTENTS

Archæological Investigations of the Carnegie Institution of Washington in the Maya Area of Middle America, during the Past Twenty-Eight Years 205
SYLVANUS GRISWOLD MORLEY, Carnegie Institution of Washington.

Eskimo Archaeology and Its Bearing on the Problem of Man's Antiquity in America 220
HENRY B. COLLINS, JR., Bureau of American Ethnology, Smithsonian Institution.

Results of Recent Archaeological Research in the Northern Great Basin Region of South Central Oregon 236
L. S. CRESSMAN, Department of Anthropology, University of Oregon.

Discoveries in Sandia Cave and Early Horizons in the Southwest 247
FRANK C. HIBBEN, Museum of Anthropology, The University of New Mexico.

Folsom and Yuma Problems 255
EDGAR B. HOWARD, University Museum, University of Pennsylvania.

A Possible Cochise-Mogollon-Hohokam Sequence 260
EMIL W. HAURY, University of Arizona.

Reconstruction of Anasazi History 264
HAROLD S. COLTON, Museum of Northern Arizona.

Burial of an Early American Magician 270
JOHN S. MCGREGOR, Archaeologist and Curator of Dendro-Chronology, Museum of Northern Arizona.

Chronology in the Middle West 299
FAY-COOPER COLE, University of Chicago.

Late Horizons in the Southeast 304
T. M. N. LEWIS, Division of Anthropology, The University of Tennessee.

Recent Advances in New York State and the Northeast 313
WILLIAM A. RITCHIE, Rochester Museum of Arts and Sciences.

The Effect of the Abbott Farm on Eastern Chronology 315
DOROTHY CROSS, Hunter College.

The Aztecs: Their Cultural and Historical Position in Middle American Archaeology 320
GEORGE C. VAILLANT, University Museum, University of Pennsylvania.

The Position of Chavin in Andean Sequences 323
WENDELL C. BENNETT, Yale University.

ARCHÆOLOGICAL INVESTIGATIONS OF THE CARNEGIE INSTITUTION OF WASHINGTON IN THE MAYA AREA OF MIDDLE AMERICA, DURING THE PAST TWENTY-EIGHT YEARS

Franklin Medal Lecture, April 23, 1942, in Symposium on Recent Advances in American Archaeology

SYLVANUS GRISWOLD MORLEY

Carnegie Institution of Washington

Twenty-eight years ago the Carnegie Institution of Washington undertook an intensive study of the Maya Civilization of southern Mexico and northern Central America.

This project had as its basis the desire to study an early civilization in as relatively a pure state as could be found, for the purpose of seeking light on the, today, vitally important question as to whether fundamental, underlying laws govern the growth of human society, or whether, like the familiar Topsy of American Literature, civilizations just "grow," following no predictable pattern, obeying no fixed laws in their development.

The Old World seemed to offer few, if any, examples of relatively high, pure cultures. Egypt had been repeatedly overrun from Asia Minor. The great nations of the Tigris and Euphrates Valleys had been as frequently conquered by Egypt. The Greeks and the Romans had built their own brilliant, distinctive civilizations on earlier cultures; while China has been a veritable melting pot of the Mongols, Tatars, Manchus, and latterly the Japanese, each of which has modified an earlier mixture, itself produced by still earlier blends. Old World civilizations everywhere were of composite rather than pure origin.

In order to find the simplest conditions possible for this complex study, the Carnegie Institution turned to one of the indigenous civilizations of the New World, namely that of the Maya, which developed, flourished, and fell in the Yucatan Peninsula, the latter, however, considered as a physiographic rather than a political unit. This peninsula, surrounded by water on three sides and separated from the adjacent continental land mass by high mountains, seemed to offer unusually favorable conditions for the study of civilization in a pure state, relatively free from adulteration by alien cultural elements. Here, if anywhere in the New World, because of an almost unique geographic and topographic isolation, a primitive culture might reasonably be expected to have run its course—rise, florescence, and decay, developed and directed by the genius of the indigenous population, conditioned by the environmental forces, but largely free from complicating external influences—an ideal laboratory for the study of human history.

In the fall of 1912, the writer presented a plan for achæological research at the ruins of Chichen Itza, Yucatan, Mexico, to the Board of Trustees of the Carnegie Institution, and the following fall (1913) this plan, somewhat amplified and accompanied by two other reports on the present status of the science of anthropology,[1] was published by the Institution.

In December, 1913, the writer's project was approved by the Board of Trustees at its annual meeting, though owing to the unsettled state of Mexico at the time, inauguration of the research was postponed until a more favorable opportunity.

On June 1, 1914, the writer became permanently associated with the Carnegie Institution, but due to continuing unsettled conditions in Mexico, it was decided to undertake first, i.e., before the excavation of Chichen Itza, explorations in northern Guatemala (Department of Peten) and western Honduras (Department of Copan) in search of new epigraphic material, in which both regions, and especially the former, were known to abound.

From 1915 to 1937 inclusive, twenty archæological expeditions were sent by the Carnegie Institution to Peten and Copan which resulted in the discovery of a number of heretofore unknown archæological sites, and the recovery of a very considerable number of hitherto unknown hieroglyphic texts, which have been published by the writer in two large monographs.[2]

[1] *Reports upon the Present Condition and Future Needs of the Science of Anthropology,* by W. H. R. Rivers, A. E. Jenks, and S. G. Morley. Carnegie Institution of Washington, pub. no. 200; Washington, 1913.

[2] *The Inscriptions at Copan.* Carnegie Institution of Washington, pub. no. 219; Washington, 1920; and the *Inscriptions of Peten,* 5 vols. Carnegie Institution of Washington, pub. no. 437; Washington, 1937–1938.

LEGEND
ARCHÆOLOGICAL SITES
△ With inscriptions, geographic coördinates observed.
▲ Without inscriptions, geographic coördinates observed.
○ With inscriptions, geographic coördinates approximate.
● Without inscriptions, geographic coördinates approximate.
GULF OF MEXICO
GULF OF HONDURAS

MAP 1. Archæological map of the Maya area.

The Second Central American Expedition, on May 5, 1916, discovered in northern central Peten a site which proved to have the earliest date in Maya chronology, and in addition, as many as ten different monuments, roughly dating from the last quarter of Baktun 8,[3] A.D. 337 to 435,[4] for which reason the name Uaxactun was given to this site, *uaxac* meaning 8 in Maya, and *tun*, stone, i.e.,

[3] The baktun was the highest time-period usually employed in recording Maya dates. It was 144,000 days, or about 394.26 years in length. The earliest contemporaneously dated monuments, as noted above, is just at the close of the third quarter of Baktun 8, in A.D. 328. Baktun 9, which witnessed the rise, florescence, and decay of the Maya Old Empire, extended from A.D. 435 to 830.

[4] The correlation of Christian and Maya chronologies now followed by most, though not all, students of Maya archæology, is that first proposed by J. T. Goodman ("Maya Dates," *American Anthropologist*, new series, vol. 7, no. 4, pp. 642–647. Lancaster, 1905), and later refined by Juan Martinez Hernandez (*Paralelismo entre los calendarios Maya y Azteca. Su correlacion con el calendario Juliano*, Merida, 1926), and J. E. S. Thompson

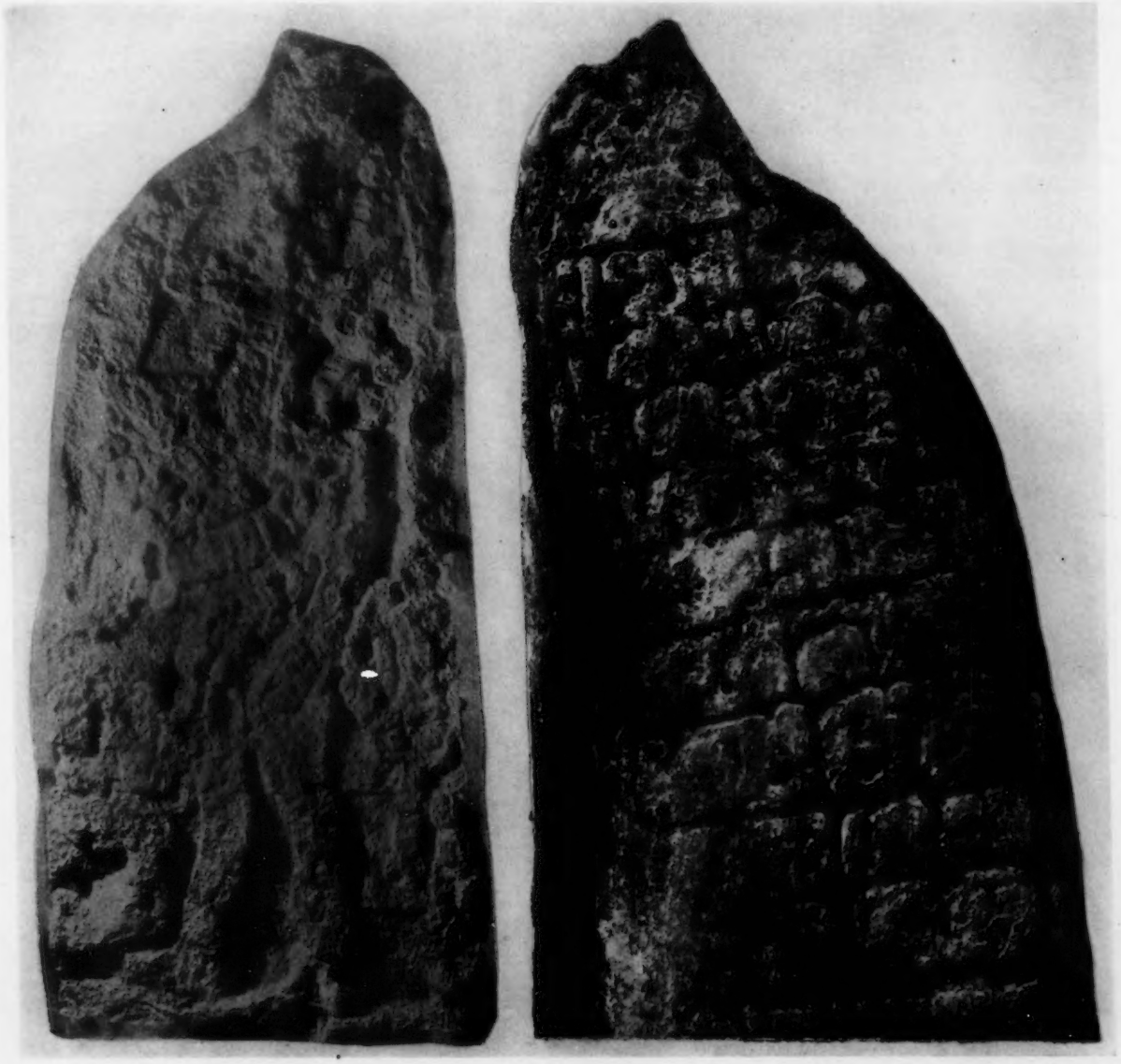


FIG. 1. Front and back of Stela 9 at Uaxactun, Department of Peten, Guatemala, discovered by the Second Central American Expedition of the Carnegie Institution of Washington on May 5, 1916. This monument is the oldest yet found in the Maya area and records the date 8.14.10.13.15 8 Men 8 Kayab of the Maya Era, or A.D. 328.

Stone 8, or a monument recording a date in Baktun 8.

The epigraphic evidence, indicating that on the basis of the dated remains Uaxactun is the oldest center of the Maya Civilziation, prompted the Carnegie Institution to undertake an intensive study of that site, which covered a period of twelve years, 1926–1937; and no excavations in the Maya field have ever proved more fruitful. The art, architecture, and ceramics at Uaxactun were found to corroborate the epigraphic evidence, all pointing to the fact that this site is one of the oldest, if not indeed, the very oldest, center of the Maya Civilization.

The figures on the earliest monuments at Uaxactun are so crudely executed, their anatomical proportions so inaccurately represented, their postures so stiff, awkward and lifeless, that it is evident they represent the first attempts at stone carving among the ancient Maya. Prior to the first, sculptured, stone stelae, Maya monuments had probably been made of wood, and upon these latter, the beginnings of the Maya hieroglyphic writing had been carved. Unfortunately, none of these wooden stelæ has survived, so that all traces of the earlier stages of the hieroglyphic writing have disappeared.

In Pyramid E-VII-sub at Uaxactun we have the earliest example of Maya architecture extant. This stucco-covered pyramid was built at a very remote date in Maya history, perhaps as early as the beginning of the Christian Era, certainly well before the first stone monuments were sculptured. Somewhat later, it was completely covered with rough rubble and made into a much larger pyramid, E-VII. Pyramid E-VII was excavated in 1928 by the Eleventh Central American Expedition, and this work exposed the earlier stucco-covered E-VII-sub, which, owing to the fact that it had been completely buried, was practically in a perfect state of preservation. The style of the

(*A Correlation of Maya and European Calendars.* Field Museum of Natural History, pub. no. 241, Anthropological Series, vol. 18, no. 1. Chicago, 1927).

FIG. 2. Pyramid E-VII-sub at Uaxactun, the oldest known example of architecture in the Maya area, uncovered by the Eleventh Central American Expedition in 1928. This very early stucco-covered pyramid may have been erected as early as the beginning of the Christian Era.

large stucco masks on this earlier pyramid is relatively so simple and undeveloped as to be almost pre-Maya, while the top of the pyramid shows that it had never supported a stone building, though there are indications that a pole and thatch construction had originally stood there. When E-VII-sub was built the Maya Civilization was still developing those cultural characteristics by which it was later to be recognized.

Finally, the earliest types of pottery in the Maya area are those found in the so-called "black dirt" deposits at Uaxactun, the earliest occupation level at this site, directly overlying the undisturbed soil. These earliest wares are red, black, or orange in color, and occur as jars, plates, and bowls; decoration is confined to incised or grooved lines. In addition, there are small modeled figurines in a red or buff ware. Both vessels and figurines are the earliest type of ceramic remains found anywhere in the Maya area. The first ceramic period at Uaxactun has been called Mamom; the next, Chicanel; the third, Tzakol; and the fourth and last, Tepeu. The first sculptured stone stelæ and the earliest use of corbeled stone roof-vaulting are supposed to have coincided with the beginning of the Tzakol ceramic period, and the Tepeu wares with the second period of corbeled roof-vaulting.

In short, the four principal lines of archæological evidence now available in the Maya area—the epigraphy, art (principally as exemplified by sculpture), architecture, and ceramics, all indicate that Uaxactun is the oldest center of the Maya Civilization yet discovered.

The range of the dated monuments at Uaxactun, moreover, is the longest in the Maya area—562 years, i.e., from A.D. 328 to 889, inclusive, extending from 8.14.10.13.15 to 10.3.0.0.0 of the Maya Era, embracing the entire Old Empire period, which, in turn, witnessed the rise, first florescence and first decline of the Maya Civilization.

During the twelve field seasons at Uaxactun a number of buildings, both residential and religious —the so-called "palace" and temple types—were excavated; the foundations under the stelæ were all examined for ceremonial *caches;* a study of ancient house sites in the immediate vicinity of the ceremonial center was carried out; and a base map was made of the city.

The most important structures excavated were two temples—A-I and A-XVIII, and a "palace," A-V. The first yielded some of the most beautiful polychrome pottery ever found in the New World, and the second, the largest piece of worked jade—an anthropomorphic figure, weighing 11½ pounds. The largest of the palace type structures, A-V, was also completely excavated; layer after layer of its complicated construction, revealing the many stages of growth through which it had passed, were removed, and the entire history of the building was traced. The discovery of three dated stelæ in the palace, two of them *in situ,* afforded valuable data as to the relative ages of different parts of this architectural complex; and the associated potsherds, which were numerous, have proved invaluable in establishing the ceramic sequence at Uaxactun. A small, relatively insignificant structure, B-XIII, was found to contain what is probably the oldest mural in the Maya area, a very fine wall painting, nearly ten feet long by four feet high, showing thirty-six human figures interspersed with hieroglyphs—the most complete wall painting ever found at an Old Empire site. Finally, the discovery of Pyramid E-VII-sub has already been described. This latter structure was part of an architectural assemblage which seems to have served as an astronomical observatory for determining the solstices and equinoxes—a great open-air observatory as it were.

One of the most important ceremonial centers of the ancient Maya world was Copan, in what is now the extreme western part of the Republic of Honduras, where nearly a third of all known hieroglyphic inscriptions are to be found. About fifty years ago, the Peabody Museum of American Archæology and Ethnology of Harvard University carried on excavations at this site for four seasons—1892–1895. The finds were spectacular, including the discovery of the famous Hieroglyphic Stairway of Temple 26, but unfortunately internal troubles in Honduras terminated the project after such promising beginnings.

In the spring of 1934, largely through the interest of the Hon. Julius Lay, then United States Minister to Honduras, Dr. Jesus Rodriguez, the Minister of Public Education of Honduras, met the writer at Copan to discuss the possibility of again inaugurating archæological work at this group of ruins. As a result of this meeting, the writer proposed a plan that was to be undertaken jointly by the Republic of Honduras and the Carnegie Institution, under which the former was to provide the day-labor needed in the excavations, repair work, etc., and transportation of supplies within the country, and the latter was to supply the technical staff, scientific equipment, etc. This

project, having been approved by both the parties concerned, was inaugurated in 1935 under the direction of the Institution's Division of Historical Research, and is now (1942) in its eighth year.

Perhaps the most important undertaking of the Carnegie Institution at Copan has been changing the course of the Copan River, which was gradually eating its way into the Acropolis. Sometime after the abandonment of the city (probably during the early Ninth Century) the Copan River,

FIG. 3. Stela 4 at Copan, the latest monument erected at this site. It dates from 9.17.12.13.0 4 Ahau 13 Yax of the Maya Era (A.D. 783). When found, it had fallen and was broken into many pieces.

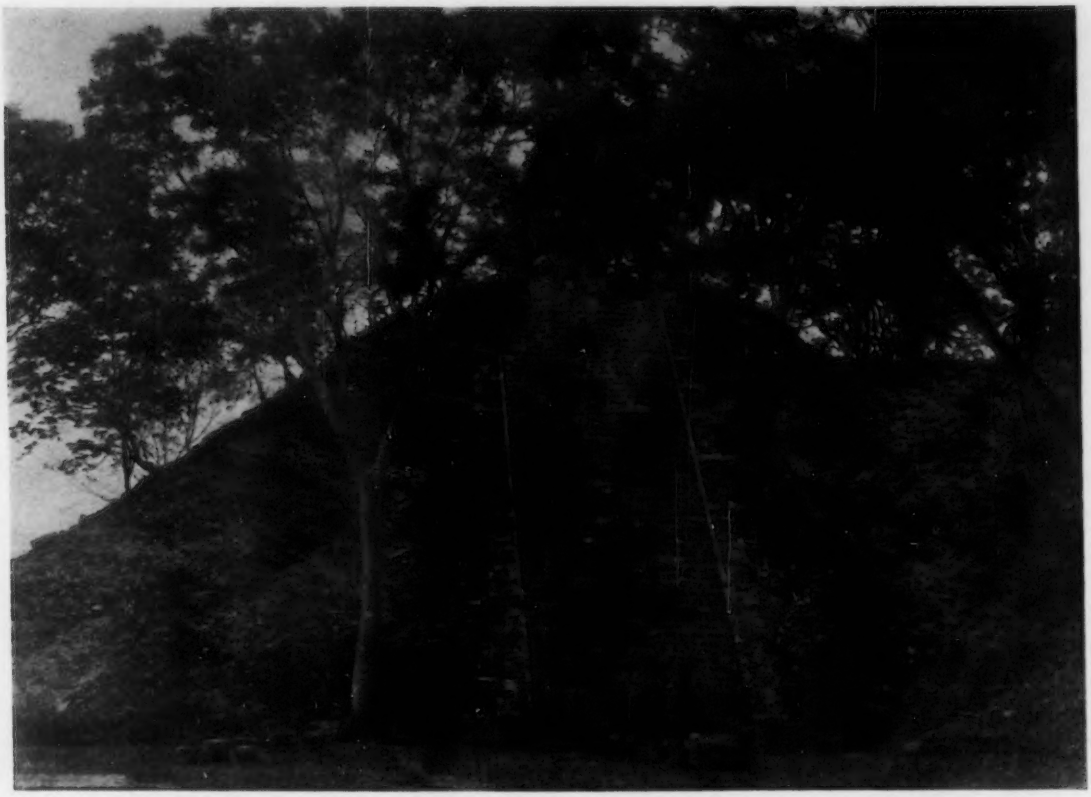


FIG. 4. The Hieroglyphic Stairway of Temple 26 at Copan, Department of Copan, Honduras, restored by the Third to Sixth Copan Expeditions in 1937–1940. The hieroglyphic inscription carved on the risers of the sixty-one steps in this stairway makes it the longest text in the *Corpus Inscriptionum Mayarum*. This stairway was dedicated in 9.16.5.0.0 8 Ahau 8 Zotz of the Maya Era, or A.D. 756.

which originally had flowed nearer the southern side of the valley, changed its course—the region is one of frequent, and occasionally intense seismological activity—and, swinging northward nearer the middle of the valley, began cutting away the northeastern corner of the Acropolis until it has exposed a section of this great artificial construction, more than 700 feet long and 118 feet high at the highest point, probably the largest archæological cross-section in the world. In order to prevent the entire destruction of the Acropolis, the old river channel was cleared out, the river dammed just below the upper opening of the old channel, and its waters diverted from the new (post-Ninth Century) channel into the old stream bed, so that the Acropolis is no longer subjected to the destructive action of the river.

Another important activity of the Copan Project has been the re-erection of the fallen monuments. Twelve of the fallen stelæ, some of them badly broken, have been set up again in firm concrete bases, the fragments being cemented back into place. During the course of this work, which has enormously enhanced the appearance of the site, all stelæ-foundations were examined for foundation *caches;* pieces of pottery, jade pendants, earrings, beads were found, and a small object of gold—the only piece of metal ever recovered under archæological conditions in an Old Empire site.

The most important architectural units which have been excavated and repaired at this site are: the Hieroglyphic Stairway of Temple 26, presenting the largest text in the *Corpus Inscriptionum Mayarum;* Temple 22, apparently dedicated to the planet Venus; the Ball Court (Structures 9 and 10); Temple 11, perhaps the most important sanctuary in the city; the Jaguar Stairway in the Eastern Court and the Reviewing Stand in the Western Court.

Occasion has been taken to examine, not only the Acropolis, but also many outlying smaller

FIG. 5. The Ball Court at Copan, flanked by Structures 9 and 10, with Stela 2 in the distance. This court, where a game not unlike basket-ball was played, was excavated and repaired by the Third to Seventh Copan Expeditions in 1937–1941. It was dedicated in 9.17.4.0.0 10 Ahau 18 Kayab of the Maya Era, or A.D. 775. The principal decorative motive is the parrot head, which is also the hieroglyph for the month Kayab when the court was dedicated.

groups of mounds for stratified deposits of pottery fragments, in the effort to establish the ceramic sequence of this site. Finally, in the modern village of Copan, a mile west of the main group of ruins, there has been built a regional museum, where the finest of the loose sculptures, of which there are many, and some of superlative esthetic merit, have been brought together, while Institution engineers have aided materially in building a water-system for the village.

Other Old Empire sites at which the Carnegie Institution has carried on archæological investigations are the following. Institution expeditions in 1921, 1929, and 1931 studied the epigraphy, sculpture, and architecture at Piedras Negras, on the Usumacinta River in northwestern Guatemala. Also in 1931, another Institution expedition spent a month at Yaxchilan in eastern Chiapas, Mexico, also on the Usumacinta River, examining the epigraphy, sculpture, and architecture, and making a surveyed map of that site. In 1932 another Institution expedition spent a month at the ruins of Calakmul in southern Campeche. Previously sixty-two stelæ had been discovered at this very large site, but besides the usual study of the epigraphy, sculpture, and architecture, and the making of a surveyed map, the Institution's expedition found forty-one additional monuments, bringing the total up to one hundred and three, by far the largest number of stelæ at one site anywhere in the Maya area. In 1933 and 1934 expeditions were sent to the then almost entirely unexplored southern section of Campeche, a no man's land lying between the Old and the New Empire regions. Several new sites—Oxpemul, Xamantun, Uxul, and Balakbal—presenting important new hieroglyphic inscriptions and architectural features were discovered. Also in 1934 an Institution expedition spent several months at Quirigua, Guatemala; four fallen monuments, in-

cluding Stela E, a great shaft of sandstone thirty-four feet eight inches high, weighing sixty-five tons, the largest piece of stone ever quarried by the ancient Maya, were again set up. During the course of these operations, all the monuments were examined for foundation *caches*, and some interesting material—finely chipped flint blades, a number of pieces of unworked jade, and a beautifully carved jade pendant—were recovered. In addition, two magnificent altars associated with

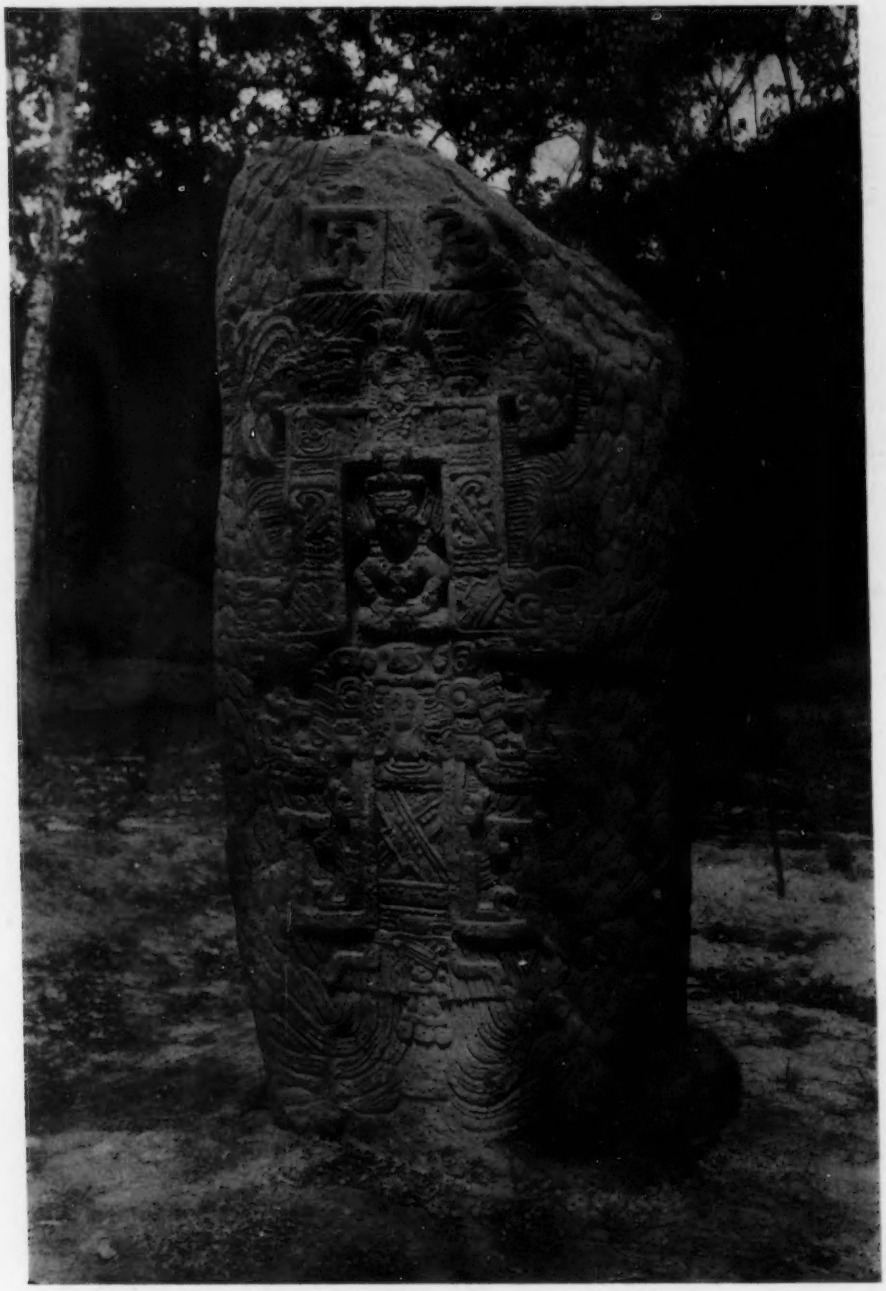


FIG. 6. Stela 1 at Quirigua, Department of Izabal, Guatemala. This monument was dedicated in 9.18.10.0.0 10 Ahau 8 Zac of the Maya Era (A.D. 800). When found, it had fallen and was lying on its back (the face shown here). It was re-erected by the Seventeenth Central American Expedition in 1934.

Zoömorphs O and P, respectively, were found; each presented a superb, dancing human figure of heroic size.

In 1923 another, exceedingly important activity was inaugurated, namely the determination of the geographic coördinates of the principal cities of the Maya Civilization. The only business bringing man into the vast, trackless forests of northern Peten is the search for *chicle*, the latex of the *Achras zapota* L.—the ingredient which makes chewing-gum chewable. The meandering trails through the forest, used by the *chicleros*, or *chicle* bleeders, are kept open only by constant travel. A trail that has not been used for two years is all but impassable, and one that has not been travelled for five years, completely disappears, engulfed by the overwhelming vegetation. If some satisfactory substitute for *chicle* in chewing-gum should be discovered, it would put an immediate end to the chicle business (for chicle has no other commercial use than in chewing-gum), which, in turn, would be followed by the total disappearance of all *chicle* trails and the consequent loss to knowledge of many important Maya sites. Fearing just such an archæological catastrophe, the writer began equipping the Institution's expeditions to the Yucatan Peninsula with the instruments necessary for determining latitude and longitude, and between 1923 and 1936 the geographic coördinates of no less than forty-three archæological sites were secured. An unexpected by-product of this activity, was that, because of these data, it became possible for the first time to make an accurate map of the northern half of Peten, Guatemala, and southern Campeche and Quintana Roo, Mexico.

Not to neglect the humbler side of ancient Maya life in all these investigations of its higher cultural manifestations, a complete comparative study of Maya house-types (the simple domestic architecture) was carried out from one end of the Maya area to the other—in the highlands of Guatemala, the lowlands of Peten, and in the northern half of the Yucatan Peninsula. It was found that the Maya of today, especially in northern Yucatan, live in exactly the same type of house made of poles and thatch, rectangular in plan with rounded ends, as did their ancestors, five to fifteen hundred years ago.

In the foregoing investigations, the Carnegie Institution has fairly well covered the period of the Maya Old Empire. Indeed Uaxactun alone has the longest range of dated monuments found anywhere in the Old Empire, from A.D. 328 to 889; there remains, however, to describe the Institution's intensive as well as extensive operations in the New Empire region of northern Yucatan.

The Chichen Itza Project, mentioned at the beginning of this article, was not inaugurated until January 1, 1924, through a contract between the Ministry of Agriculture and Interior of the Mexican Government and the Carnegie Institution of Washington.

Chichen Itza was chosen as a New Empire center of intensive study by the Institution because of a number of outstanding characteristics: first, it was the largest city of the New Empire; second, it was the most sacred city of the New Empire, the Mecca of the Maya World in the Thirteenth and Fourteenth Centuries, pilgrimages having been made thereto from all parts of the northern Yucatan Peninsula and even from points more distant;[5] third, its architecture has closer affinities with that of archæological sites in the highlands of Mexico, than the architecture of any other center in the Maya area; and fourth, it is one of the very few sites in northern Yucatan having a direct chronological and documentary connection with the Old Empire.

The Chichen Itza Project was continued for seventeen years, 1924–1940, and had a two-fold objective: (1) to understand and interpret Maya culture, its motivating forces, its development and decay in so far as these social evolutionary processes could be studied at Chichen Itza; and of equal importance (2) to repair and, in a few cases, to restore the different buildings excavated so that they should serve as educational exhibits for posterity.

During the seventeen years the Institution worked at Chichen Itza, a number of important constructions dating from all periods of the city's history, A.D. 879 to 1441, were excavated and repaired so that, with reasonable care, further deterioration will be permanently arrested. The most important of these buildings are: (1) the Temple of the Warriors and associated colonnades at the Group of the Thousand Columns; (2) the Monjas and its annexes; (3) the Caracol or Astronomical Observatory; and (4) the Marketplace, also at the Group of the Thousand Columns.

The Temple of the Warriors was so named be-

[5] Objects have been found in the Well of Sacrifice at Chichen Itza, which came from as far north as the State of Jalisco, Mexico, and from as far south as the Republic of Costa Rica.

cause of the figures of warriors sculptured on the four sides of the twenty stone columns or piers which supported the corbeled roof-vaulting of this building. A remarkably fine altar was found against the back wall of the sanctuary of this temple which was supported by Atlantean figures, breast high. The walls originally had been painted with striking murals, of which it was possible to salvage parts of two only: (1) a scene of human sacrifice to Kukulcan, the Feathered Serpent, patron-deity of Chichen Itza; and (2) a fishing village on the north or east coasts of Yucatan, as it appeared about six or seven hundred years ago. By far the most important discovery in this construction, however, was made inside the pyramid, where an earlier buried temple was encountered. In a covered limestone urn, buried under the floor of the sanctuary of the earlier temple, where the corresponding altar had formerly stood, a turquoise mosaic plaque was found, eight and one half inches in diameter, its principal design consisting of two pairs of facing serpent heads, evenly spaced. Beyond any question this plaque is one of the finest examples of ancient American art and handcraft ever brought to light.

The Monjas, or so-called Nunnery, though its former function could hardly have been such, is a great architectural complex, which grew by accretion, probably over several centuries, and which shows at least four major periods of construction, characterized by corresponding changes in the masonry. Considerable quantities of ceramic fragments were recovered during the excavation and repair of this building which, together with the associated types of masonry, permit significant conclusions to be drawn as to the correlation of architectural and ceramic periods at Chichen Itza.

One of the most important buildings in the Maya area is the Caracol, or Astronomical Observatory at Chichen Itza. This is a round tower surmounting two rectangular platforms, the lower one of considerable size. The tower itself is built

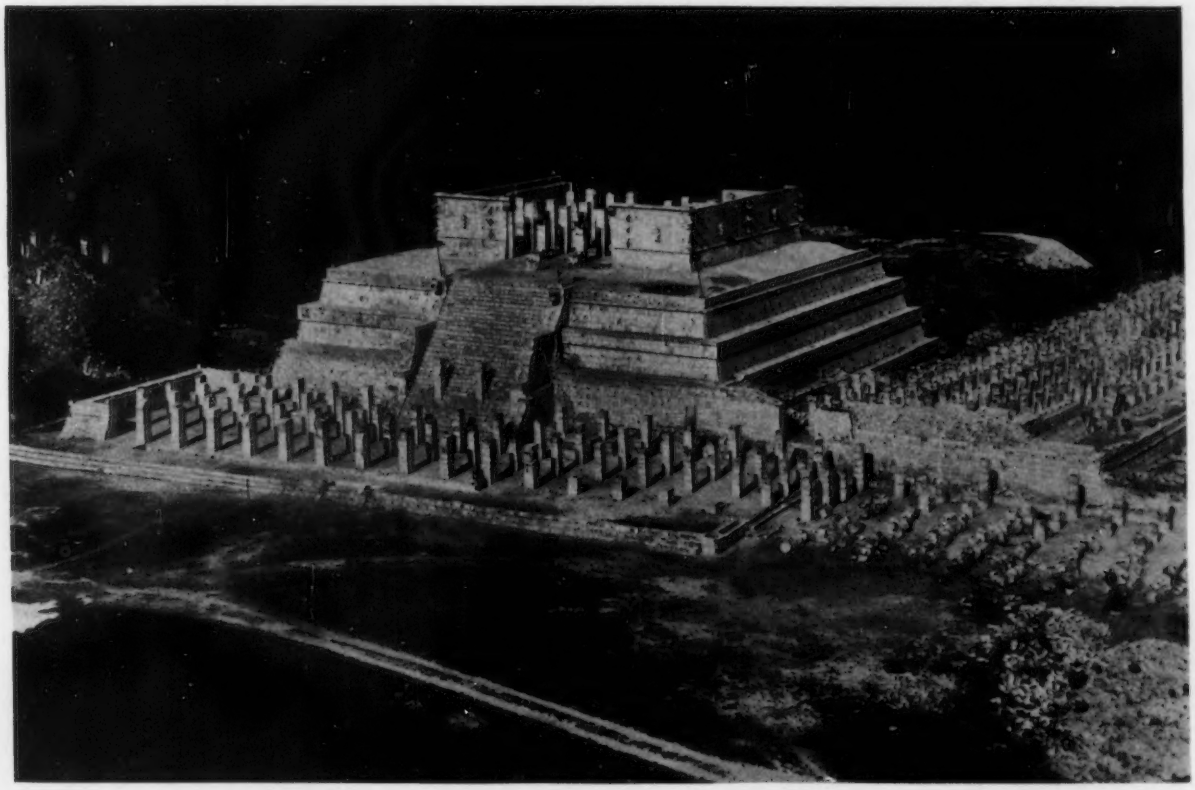


FIG. 7. Temple of the Warriors at Chichen Itza, Yucatan, Mexico. This temple was excavated and repaired by the Second to Fifth Chichen Itza Expeditions in 1925–1928. In front of it is the Northwest Colonnade and to its right, the North Colonnade. The upper halves of all three buildings, *i.e.*, above the level of the tops of the columns, have not been restored. This was the second most important temple at Chichen Itza, being dedicated to Kukulcan, the Feathered Serpent, patron deity of the city, probably in the Twelfth or Thirteenth Centuries.

FIG. 8. The Monjas at Chichen Itza, excavated and repaired by the Ninth to Eleventh Chichen Itza Expedition in 1932–1934. This building, the largest of the "palace" type at this site, may possibly have served as the residence of the Itza rulers. It was probably erected in the Tenth Century.

in two stories, both round, the upper story being somewhat less in diameter than the lower story. A spiral stairway ascends from the ground floor of the latter to a small chamber in the second story, from which various lines of sight (small tunnel-like openings running through the thick masonry from inside to out) coincide with astronomically significant bearings. For example, a line of sight along one of the axes of the small western tunnel cuts the sun in half at the moment of sunset on March 21, the vernal equinox.

The Market Place on the south side of the Court of the Thousand Columns is a strikingly beautiful colonnade, 240 feet long and 15 feet wide, of alternating round and square columns. A wide entrance at the back gives access to a sunken court, surrounded by a peristyle. Although the name Market Place has been given to this construction, it is more likely to have been a council chamber.

In addition to the foregoing major architectural units, some twenty smaller buildings of varying types and sizes have been excavated and repaired at Chichen Itza—temples, colonnades, ball courts, vapor-bath houses, and dance platforms, so that a considerable part of this ancient city has been exhaustively studied.

It has been stated that the range of dates at Uaxactun extends from A.D. 328 to 889, and at Chichen Itza from A.D. 879 to 1441, i.e., an overlap of ten years. In 1441 Chichen Itza was finally abandoned, the last of the Itza leaving Chichen Itza and migrating southward where they re-established their new capital, called Ta Itza, or, as it is more generally known by its Hispanicized form, Tayasal, on a high peninsula at the western end of Lake Peten Itza in central Peten, Guatemala. Here they maintained their political independence for another two hundred and fifty years, until they were finally conquered by the Spanish under Martin de Ursua in 1697.

In 1921 and 1922 the Carnegie Institution carried on excavations at Tayasal and established two definite periods of occupancy at this site, separated

by a long interregnum, probably of some seven centuries, indicated by an archæologically sterile stratum, several feet in depth. The earlier of these occupation levels, because of the association of dated stelæ, was clearly referable to the Old Empire, while the later, because of the associated ceramic remains, was as clearly, very late, i.e., referable to the late New Empire.

With these three sites—Uaxactun, Chichen Itza, and Tayasal—covered by intensive study, the Carnegie Institution has under its purview the entire range of Maya history—a minimum of fifteen hundred years.

As in the case of the Old Empire region, the Carnegie Institution has sent a number of archæological expeditions to various parts of the New Empire region. The several Institution expeditions to southern Campeche have already been described; in addition, two expeditions—in 1916 and 1918—have been sent to the east coast of Yucatan which resulted in the discovery of a number of new sites and the identification of a definite archæological sub-province along the east coast of the Peninsula.

A joint Architectural and Ceramic Survey of Yucatan has been undertaken, seven expeditions having been sent to various parts of Yucatan and Campeche in 1929–1933, 1935, and 1936. As a result of this survey, architectural and ceramic sub-provinces have been delimited, and the groundwork laid for basic conclusions as to the origin, development, and distribution of New Empire architectural and ceramic types.

In order to ascertain the historic background of the Maya at the time of the Spanish Conquest, a study of the archives in Spain, Mexico, Guatemala, and Honduras has been made. A group of investigators, working in the archives of these countries, has already brought to light important and heretofore unknown manuscript material bearing on this subject.

During the past decade the Institution has

FIG. 9. The Caracol, or Astronomical Observatory at Chichen Itza, excavated and repaired by the Second to Fourth and the Sixth to Eighth Chichen Itza Expeditions in 1925–1927 and 1929–1931. This important building was the center of the scientific life of the ancient city. Here astronomical observations were made, and here the positions of the four principal stations of the year—the equinoxes and solstices—were determined. The Caracol may have been erected in the Tenth Century.

FIG. 10. The so-called Market Place at Chichen Itza. This building, composed of a very long colonnade with a sunken court behind it, the latter surrounded by a peristyle, is, in all probability, not a market-place at all, but more probably was a council chamber, since a decorated dais, or throne, was found against the back wall. It was excavated and repaired by the Eighth Chichen Itza Expedition in 1932, and was probably built in the Twelfth to Thirteenth Centuries.

carried on excavations at a number of sites in the highlands of Guatemala, lying just south, and beyond the southern periphery, of the Old Empire.

The most important of these is Kaminaljuyu, in the southern outskirts of Guatemala City, a very large ceremonial center, non-Maya in character, as defined here, but having had close trade relations with Old Empire centers, and even with points as far distant as San Juan Teotihuacan in central Mexico, as established by the ceramic wares found at this great highlands center. The biggest piece of jade ever found in the Western Hemisphere, a large, unworked, water-worn boulder, weighing just over two hundred pounds, was discovered here in 1937. In the highlands, the Institution has also excavated at Zacualpa and at several ruins on Lake Atitlan; work has been done at San Agustin Acasaguastlan in the Motagua Valley and at Campana San Andres in western Salvador.

All the foregoing activities are primarily archæological in nature, but, in order to present a more complete picture of the Maya Civilization, six other projects, involving the coöperation of non-archæological disciplines, were inaugurated to cover the whole Maya area: (1) an ethnological survey; (2) a linguistic survey; (3) a medical survey; (4) an anthropometric survey; (5) a survey of the flora and fauna; and (6) a geographical survey. Scientific agencies, other than the Carnegie Institution of Washington, were invited to participate in these collateral studies.

Through a coöperative arrangement with the Department of Anthropology of the Division of the Social Sciences of the University of Chicago, the ethnologic problem has been attacked simultaneously in northern Yucatan and in the highlands of Guatemala and Chiapas, Mexico, by a group of investigators who are still (at the present writing) engaged upon these studies. Regional differences naturally have been found, but certain fundamental traits, which perhaps may be described as definitely Maya, are beginning to be identified.

Also in collaboration with the same department of the University of Chicago, there has been undertaken a comparative philological study of the different branches of the Maya linguistic stock from the Huasteca of northern Veracruz and adjacent parts of San Luis Potosi, and Tamaulipas, Mexico, in the extreme northwest, to the Chorti of eastern Guatemala and western Honduras. New techniques in sound recording have been developed and it is hoped closer analyses of the phonetics of the several branches of the stock will be possible.

In collaboration with the School of Public Health of the Medical School of Harvard University, medical surveys of northern Yucatan and the highlands of Guatemala have been completed. The general results of the medical surveys indicate that the Maya area is one of the healthiest regions in the world.

In a joint project with the Department of Anthropology of Harvard University and the Institution's Department of Genetics, an extended series of anthropometric measurements, basal metabolism tests, nutritional studies, etc. have been made on the Maya of northern Yucatan. The anthropometric survey, however, has not as yet been extended to the highlands of Guatemala.

In connection with the University Museums of the University of Michigan, a study of both the flora and the fauna of the Yucatan Peninsula has been undertaken; and in collaboration with the Bureau of Plant Industry of the United States Department of Agriculture, Cornell University, and the United Fruit Company, a study of the agricultural system of the modern Maya, especially as applied to the cultivation of maize, upon which the whole Maya Civilization was based, has been carried out. Geographically the region is highly isolated and the flora and fauna show corresponding ecological differentiation.

In connection with Clark University and the University of Florida, geographic studies were undertaken in the highlands of Guatemala while the Institution's own Geophysical Laboratory has been studying seismologic and volcanic phenomena in the same region. A study of the *cenotes* of Yucatan—the principal source of water in the northern part of the peninsula—has been made in collaboration with Duke University.

These collateral investigations in ethnology, linguistics, archives, epidemiology, anthropometry, flora, fauna, geology, and geography, together with the various archæological projects herein outlined, have made possible the reconstruction of a fairly complete picture of the Maya Civilization and of the environment which produced it.

In closing, one further phase of the investigations of the Carnegie Institution of Washington in the Middle American field during the past twenty-eight years may, perhaps, be emphasized, namely, a practical demonstration on the part of an American research institution of the Good Neighbor Policy.

In the three Latin American Republics next adjoining us to the south—Mexico, Guatemala, and Honduras—the Carnegie Institution of Washington has left magnificent memorials of international good will and friendship in the ancient Maya cities which it has excavated and repaired; Chichen Itza in Mexico, Quirigua in Guatemala, and Copan in Honduras.

ESKIMO ARCHAEOLOGY AND ITS BEARING ON THE PROBLEM OF MAN'S ANTIQUITY IN AMERICA

HENRY B. COLLINS, JR.

Bureau of American Ethnology, Smithsonian Institution

(*Read April 23, 1942*)

WORKERS in the fields of Eskimo archaeology and ethnology have usually made a clear distinction between the problem of the origin of the Eskimo and that of the original peopling of the New World. This is entirely proper, since there can be no justification in assuming that, because Eskimo remains of some antiquity have been found at Bering Strait, they are in any way connected with the first migrants who are thought to have entered America at that point. Recent developments, however, force consideration of the possibility that some such connection may have existed. At Bering Strait an unbroken sequence of Eskimo culture has been established, the oldest stage of which—the Old Bering Sea—may date from the beginning of the Christian era (Jenness, 1933, 1941; Collins, 1937); and the spectacular Ipiutak culture recently discovered at Point Hope on the Arctic coast has been described as pre-Eskimo (Rainey, 1941*b*). Moreover, Old Bering Sea and Ipiutak exhibit clear and unmistakable affinities with Mesolithic-Neolithic horizons of northern Europe and southern Siberia, which is particularly significant because the Siberian Neolithic has also been suggested as the source of the basic American Indian culture (Spinden, 1937; Clark, 1940). Finally, one of the chipped points from the Siberian Neolithic bears a striking resemblance to the Yuma (fig. 4, *1*). The lines of evidence thus seem to converge and bring into a single focus what have heretofore appeared as separate problems. To test the validity of this picture, it seems timely to examine the present evidence relating to the origin of the oldest Eskimo culture, its possible age in relation to the oldest known culture horizons elsewhere in America, and the rôle of the Siberian Neolithic as a reservoir from which American culture was derived.

PREHISTORIC ESKIMO CULTURES

Nowhere, perhaps, is archaeology more obviously an extension of ethnology than in the Eskimo area. At many places along the coasts large refuse mounds mark the sites of old Eskimo villages, some of which have been abandoned for centuries, while others are still occupied. The village on Little Diomede Island in the middle of Bering Strait, established during the oldest known period of Eskimo culture, is one of those that is still inhabited. Animal remains in even the oldest middens are those of existing species—seals, walrus, whales, fish, caribou, mollusks, and birds. Because the frozen ground has preserved many objects that otherwise would have perished, we get an unusually clear and detailed picture of life conditions in the past. The quantity of material recovered from the middens is large, the implement types are often elaborate and specialized and, fortunately for our purposes, are found to have undergone considerable modification in prehistoric times. Developmental changes in art, harpoon heads, and numerous other implements have provided the framework for a relative chronology that carries Eskimo culture back for probably two thousand years.

Within this period Eskimo groups have spread eastward to Greenland and southward to Prince William Sound, occupying the coasts and at numerous places penetrating the interior. Permanent or seasonal shifts of population between coast and interior have brought far-reaching changes in Eskimo economy in the Coronation Gulf region (Jenness, 1923), around Hudson Bay (Birket-Smith, 1929), and doubtless also along the rivers in northern and western Alaska where the relationships between coastal and interior Eskimo groups are not yet clearly known. In contrast, the Bering Strait region, favored by an abundance of food animals and driftwood, sustains a maritime form of Eskimo culture, the essential pattern of which has remained unaltered for centuries.

The archaeological picture may be summarized briefly as follows. In northern Alaska the oldest stage of Eskimo culture that has been fully described is the Old Bering Sea, centering around Bering Strait. On St. Lawrence Island

the Old Bering Sea was succeeded by the Punuk, which, though primarily an outgrowth of the older culture, had also acquired a number of new elements from Siberia (Collins, 1935, 1937). The Birnirk, characteristic of Point Barrow and the Arctic coast of Alaska, seems also to have been derived from the Old Bering Sea culture. According to present indications, the Birnirk was the ancestral stage that gave rise to the Thule culture of the Hudson Bay region and Greenland. East and north of Hudson Bay, from Newfoundland to North Greenland, are found the remains of the Dorset culture, which preceded the Thule (Jenness, 1928). Though it shows some points of resemblance to Old Bering Sea, the origin and exact relationships of the Dorset are as yet obscure. The older remains from the Alaska Peninsula (Weyer, 1930), Kodiak and the Aleutian Islands (Hrdlička, 1937), and Cook Inlet (De Laguna, 1934) are of a generalized Eskimo character, though the exact relationships to northern stages of culture are not clear.

An initial step in dating the northern Eskimo sequence is provided by Mathiassen's demonstration (1930) that the Inugsuk culture of West Greenland was contemporaneous with the Norse settlements of the thirteenth or fourteenth centuries.[1] The Thule culture of central Canada, from which the Inugsuk developed, might reasonably be dated around 1000 A.D. The ancestral Birnirk stage in Alaska is probably several centuries older, and the still earlier Old Bering Sea culture may possibly date from around the beginning of the Christian era.

The Old Bering Sea was an already highly developed, specialized Eskimo culture, distinguished by an elaborate art style and many ingenious forms of implements. Many of the features that give the Old Bering Sea culture its characteristic stamp appear to have developed locally. Its roots, however, extend deep into the Old World, for it is only in Eurasia that we find either archaeologically or still existing all of the basic Old Bering Sea elements, such as the square earth-covered house with entrance passage, skin boats, sleds and toboggans, the toggle harpoon head, inserted side blades on implements, the throwing board and bird dart, lamps, pottery vessels, needlecases, chipped stone and rubbed slate implements.

The remarkable Ipiutak culture recently discovered by Rainey and Larsen at Point Hope on the Arctic coast of Alaska, has not been fully described, and its exact status in relation to other stages of Eskimo culture is uncertain. It lacks such typical Eskimo elements as pottery, lamps, sleds, rubbed slate implements, and harpoon floats. Moreover, it exhibits many unique features that set it apart as the most divergent and specialized form of culture known from any part of the Arctic. On the other hand, many of the Ipiutak specimens bear a typical Old Bering Sea ornamentation. Harpoon heads include an exact Old Bering Sea – Birnirk type with side blades and trifurcated spur; and these, together with socket pieces and foreshafts which are generally similar to, though even more elaborate than, those of the Old Bering Sea, show that the Ipiutak people possessed a harpoon complex that was already highly developed even though it may have lacked the ice pick, finger rest, and float (Rainey, 1941*b*, pl. 2, figs. 4, 5, 8). Side prongs for bird darts, some types of bone arrowheads, snow goggles, adzlike scrapers with abruptly bevelled edge, are all identical with specialized Old Bering Sea types, to name only a few of the considerable number of features Ipiutak shares with Old Bering Sea or other aspects of Eskimo culture. Thus, despite its pronounced deviations and extreme specialization, Ipiutak is obviously related in some way to Old Bering Sea, as might have been expected since the two cultures occupied the same region and could have been separated by no great interval of time.

Rainey recognizes the relationship between Ipiutak and Old Bering Sea art, but despite this regards the Ipiutak as an independent, pre-Eskimo culture that "departs so widely from this basic and ancient [Old Bering Sea Eskimo] pattern that there is little real connection other than in art style" (1941*c*: 171). "The Ipiutak material illustrates another cultural form which does not correlate with the basic Arctic coast pattern . . . and is more ancient than this basic pattern which has persisted in the Western Arctic through many centuries until the present time" (1941*b*: 373). Final determination of culture status is here made to depend more on absent than on present traits; relationship between Ipiutak and the oldest Eskimo culture (Old

[1] In agreement with this dating, the Punuk stage in Alaska, which was contemporaneous with the Thule, possessed a number of elements characteristic of the late Iron Age in northern Eurasia: plate armor, bone daggers, triangular-sectioned bone and ivory arrowheads with single barb, link ornaments and pendants, art motives, and iron in small quantities.

Bering Sea or Okvik) is denied because the "total trait complexes" of the two are so different, each possessing numerous features lacking in the other. This, however, seems an overexacting requirement for proof of cultural relationship. The problem is to determine the *degree* of relationship, a procedure requiring evaluation of both positive and negative evidence—correspondences as well as deviations. And regardless of deviations, cultural relationship of some kind is indicated when specific resemblances in important categories are present.[2]

In this instance it is difficult to see how a lack of correlation can be claimed when, in addition to a very elaborate art style and the above-mentioned list of specialized implements possessed in common with Old Bering Sea, the Ipiutak collection includes 14 types of implements—217 specimens—that are "modified forms of characteristic Eskimo types appearing in all stages of western Eskimo culture" and 19 other types—1,128 implements—that "occur in some form in Eskimo culture, but in addition have a wide distribution outside the Eskimo area" (Rainey, 1941*b*: 369). These specific and general resemblances between Ipiutak and prehistoric Alaskan Eskimo culture are clearly indicative of some degree of cultural relationship, but until these resemblances and differences are evaluated it will not be possible to determine the exact position of Ipiutak in relation to the cultural continuum already established in northern Alaska.

The Ipiutak site is a large one, and some sections of it are reported to be older than others. It will probably prove to have been in part contemporaneous with and in part older than Old Bering Sea. However, its situation on a low gravel spit or barrier reef formed by combined action of shore currents, waves, and ice precludes any great antiquity. Formations of this kind are of relatively recent origin, especially one like the Point Hope spit which, as Kindle (1909) has shown, was built up primarily by the scouring action of the ice pack. The spit is still active physiographically, its north shore being gradually washed away as fresh ridges of gravel are deposited along the south side.[3] Cultural factors which also point to the comparative recency of Ipiutak are an ivory back-scratcher with one end carved to represent a hand, and artificial ivory eyes, nose plugs, and mouth-covers found with burials, all of which are suggestive of Chinese influence probably not earlier than the Chou or Han dynasties (Laufer, 1912: 299–305; Wong, 1932: 59–62). It seems reasonable to conclude, therefore, that though Ipiutak may be the oldest Eskimo site thus far known, its maximum age is probably not much more than 2,000 years.

Resemblances Between Eskimo and Mesolithic-Neolithic Cultures of Eurasia

One of the most striking characteristics of the Ipiutak culture is the great number of small, delicately chipped stone implements. The older stages of Eskimo culture—Old Bering Sea, Kachemak Bay, Aleutian, Kodiak, Dorset—are all characterized by the relative abundance of chipped stone implements in contrast to the Punuk, Thule, and recent stages where rubbed slate greatly predominates (Collins, 1937: 334–338). Ipiutak represents a further step in this direction, with rubbed slate blades entirely ab-

[2] One of the reasons Rainey gives for separating the Ipiutak culture from Eskimo, and the only concrete evidence adduced in support of the postulated interior origin of the Ipiutak people is the preponderance of arrowheads and the relative scarcity of harpoon heads: "One of the most striking contrasts between this material and Eskimo collections is that there are only 50 harpoon heads as opposed to 500 arrowheads, a circumstance which is practically the reverse of that in other collections from the Arctic coast. . . . From the Okvik site on Punuk Island there are 217 harpoon heads and 28 arrowheads." (1941*b*: 369–370.) It is a mistake, however, to assume that the bow and arrow are unimportant in Eskimo culture or that arrowheads are relatively rare on the Arctic coast. Though they are less common than harpoon heads at the oldest Eskimo sites—Old Bering Sea and possibly Birnirk—the reverse is true of later sites, particularly those on the mainland. The Okvik site, on Punuk Island some 150 miles below Bering Strait, is exceptional rather than typical; Punuk is a tiny islet off the east end of St. Lawrence Island, and the paucity of arrowheads there is explained by the absence of large birds such as ducks or geese and particularly of caribou, the animal the Eskimos most often hunt with bow and arrow. At all Eskimo sites on the mainland where caribou are hunted, arrowheads are abundant, usually outnumbering harpoon heads. At Wales, for instance, I found 275 arrowheads and 129 harpoon heads; five sites in Norton Sound yielded 24 arrowheads and 1 harpoon head; on Nunivak Island (where there were caribou), the proportion was 23 arrowheads to 9 harpoon heads. On the Arctic coast the preponderance of arrowheads is equally great, to judge from J. A. Ford's collections in the U. S. National Museum from recent and protohistoric Eskimo sites around Barrow, in which the arrowheads number 338 and the harpoon heads 98.

[3] At Gambell, St. Lawrence Island, village sites of Old Bering Sea and later periods were built on a gravel spit formed in this same way (Collins, 1937: 33).

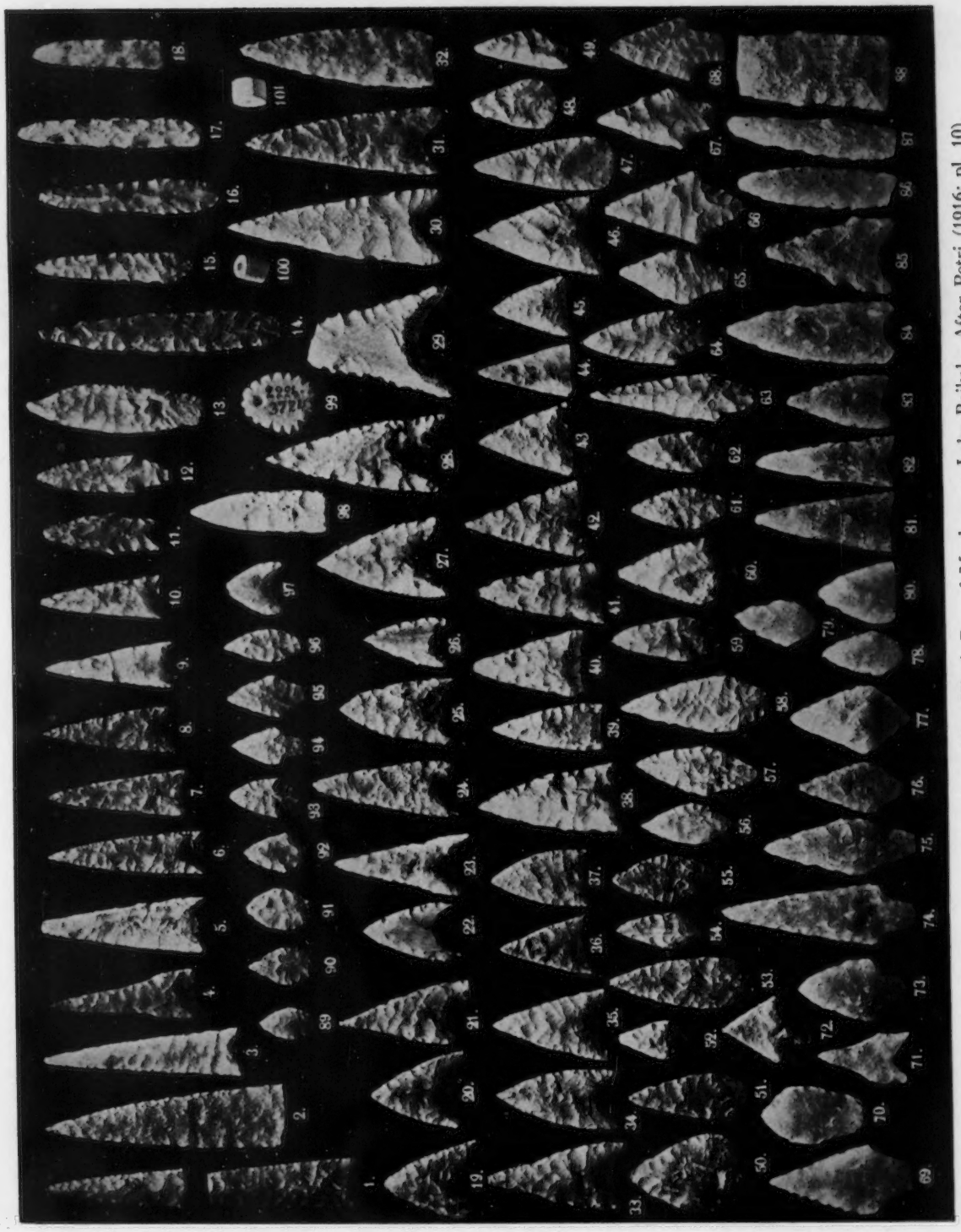


FIG. 1. Neolithic stone implements from Ulan-Khad, Bay of Muchor, on Lake Baikal. After Petri (1916: pl. 10). 99, stone pendant; 100, 101, stone beads.

sent. On comparing Rainey's chipped stone implements with those from other early Eskimo horizons, we find a number of close similarities. The small narrow Ipiutak blades with straight, slightly concave, or pointed base, and the small leaf-shaped and lozenge-shaped blades (Rainey, 1941*b*: pl. 6, figs. 1–8) are duplicated or closely approximated by specimens from Solberg's "Stone Age" in Disko Bay, Greenland—probably in part of Dorset origin (Solberg, 1907: pl. 12) and from De Laguna's (1934: pl. 30) Kachemak Bay culture, Cook Inlet, as well as by occasional examples from the Aleutian Islands and by others, mostly unpublished, from Old Bering Sea and Birnirk sites. Some of these types also occur sporadically, but apparently as late developments, in California and elsewhere in North America (Wilson, 1899: figs. 89, 91–93, 101, 109, 139–141; pl. 31, fig. 12).

Turning to Asia, we see that these small, finely chipped blades are among the types found at old sites in Kamchatka and the Kurile Islands, where the general aspect of culture is rather close to that of the prehistoric Eskimo (Jochelson, 1928: pl. 6; Torii, 1919: pl. 28; Nakayama, 1934; Schnell, 1932: pls. 12, 14).

As Rainey points out (1941*b*: 374), the slender Ipiutak blades also find close parallels in Neolithic specimens from Lake Baikal described by Petri (1916: pl. 10, reproduced here in fig. 1). The Baikal blades, from the famous Ulan-Khad site, are mostly small arrow points, and include forms with deeply concave bases and others with well-defined tangs (fig. 1, *19–29*, *64–69*, etc.), but with these exceptions the similarity is very close indeed. If we bring the Dorset and Greenland "Stone Age" into the comparison, even these would be included, for many Dorset arrow points have deeply concave bases (Mathiassen, 1927, 1: pl. 61, figs. 7–9; Wintemberg, 1939: fig. 2, *5*, *8–11*) and in the "Stone Age" there are tanged forms similar to some of Petri's (Solberg, 1907: pl. 12).

Small chipped arrow points of the Ipiutak-Siberian types are not limited to eastern Asia or the Baikal area, but are characteristic of a widespread Neolithic complex extending from Mongolia and the Angara region to the west slope of the Urals (Berkey and Nelson, 1926; Vitkovsky, 1882: pl. 2, fig. 3, *a–k*; Tolmachev, 1913: pl. 5, fig. 3; Prokoshev, 1940: pl. 3, figs. 9–14).

This Neolithic complex includes another important Eskimo feature—lances and knives with rows of small stone blades inserted in the edges. The writer has remarked on the possible significance of the fact that Old Bering Sea and Birnirk harpoon heads were often equipped with stone side blades, as were the slotted bone points of the Maglemose in northern Europe (Collins, 1935: 467).[4] Ipiutak now affords an even closer parallel. In addition to side blades on harpoon heads there are also bone and ivory arrowheads and lance heads with two rows of such blades (Rainey, 1941*b*: pl. 3, figs. 2–5, 10). The Ipiutak discoveries, together with Okladnikov's demonstration (1938) that side-bladed knives and lances were typical of the earliest stages of Neolithic culture around Lake Baikal, provide a time perspective heretofore lacking and enable us to trace the distribution of these implements at widely separated sites from Scandinavia to northern Alaska (fig. 2). At the two extremes are the slotted bone points (projectile points and knives) from Maglemose sites in southern Sweden, Denmark, Belgium, northern Germany, and Esthonia (Clark, 1936: figs. 41, *21–25*, 47, 55, *6*; Madsen, 1873: pl. 40; Vebaek, 1938: figs. 1, 2) and the similarly slotted arrowheads and lance heads of Ipiutak. Intermediate geographically, and probably also in time, are the side-bladed arrowheads and lances (or knives) from the Pychma River, Perm, just east of the Ural Mountains (Tolmachev, 1913: pl. 6, figs. 8–12), the side-bladed lances and knives of the Lake Baikal region (Vitkovsky, 1881: pl. 3, figs. 4, 6; Okladnikov, 1938: fig. 2, fig. 3, *7*, *9*), and the knives with inset flint blades found by Andersson (1934: 230, 242, 249, pl. 24, *1*) at Neolithic Yang Shao sites in Kansu and eastern Tibet.

Curwen (1941) has suggested that the flint-bladed sickles from the Swiss lake-dwellings, Egypt, Spain, and Mesopotamia, as well as modern Australian knives and spears with a row of small cutting blades in the side, represent survivals among early agriculturists and present-day hunters, respectively, of two typical Mesolithic implements—a "general purpose" knife and a spear—both equipped with inset blades of stone. While this conclusion seems inescapable as regards the sickle, the side-bladed Australian spear might be explained as an example of convergence; at any rate it has not been recorded

[4] The only known example of a side-bladed harpoon head from the central Arctic regions is one described by Mathiassen (1927, 1: 209) from Button Point, Bylot Island. This was evidently a Dorset head, to judge from Mathiassen's statement that it was similar to those he illustrates on plate 61, figures 17–22.

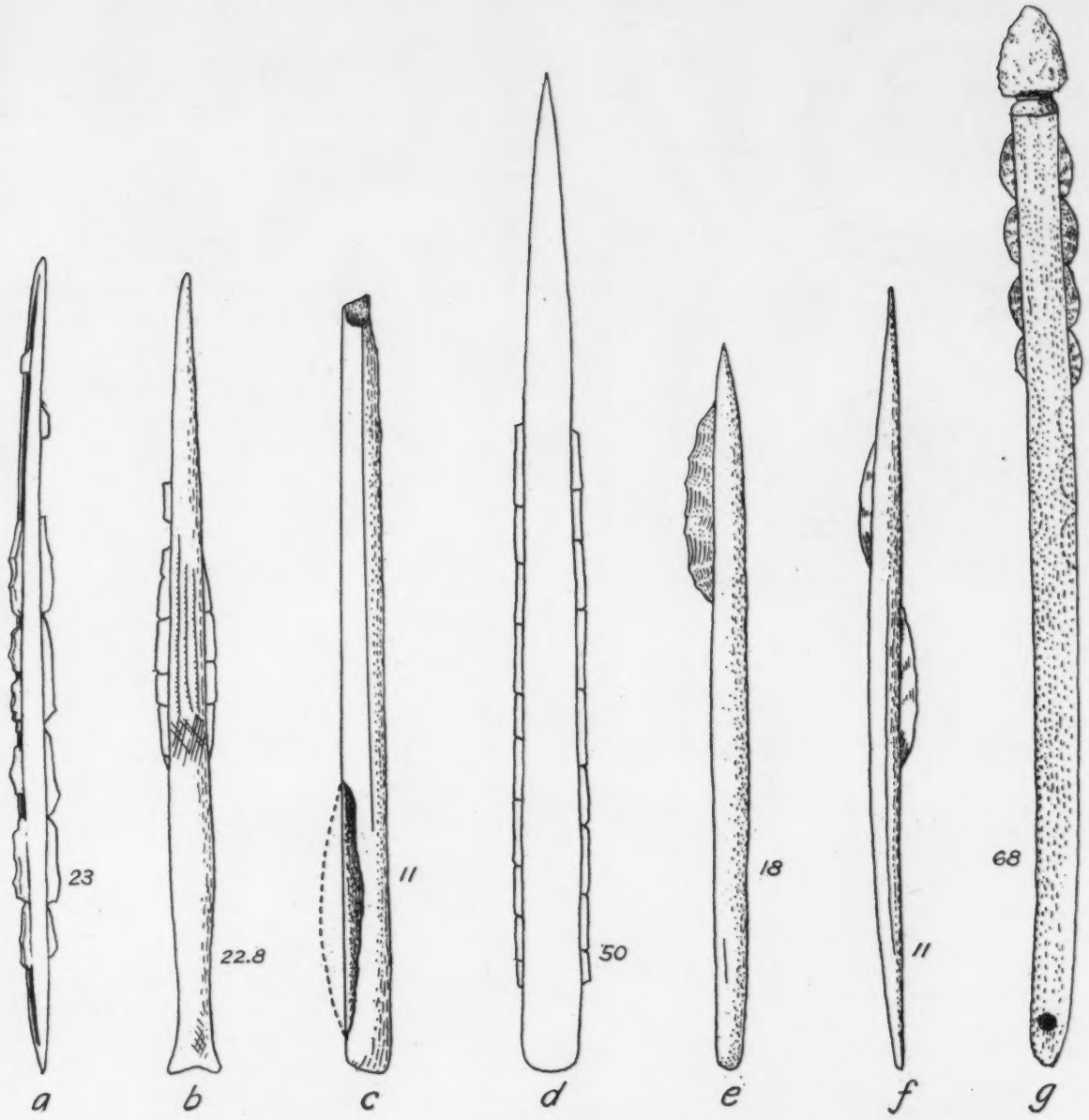


FIG. 2. Side-bladed implements—Mesolithic, Neolithic, and Eskimo. *a*, *b*, Denmark, after Madsen (1873: pl. 40, *3*, *5*); *c*, Pychma River, District of Kamychlov, Perm, after Tolmachev (1913: pl. 5, *10*); *d*, Ponomarevsk, Angara River, Siberia, after Okladnikov (1938: fig. 3, *9*); *e*, *f*, Point Hope, Alaska (Ipiutak culture), after Rainey (1941*b*: pl. *3*, *3*, *10*); *g*, Southampton Island, Hudson Bay, after Boas (1907: fig. 178). (Not to scale; figures indicate approximate length in centimeters.)

archaeologically from Oceania. The Eskimos, however, provide a clear example of a hunting people who have carried on this Mesolithic tradition. In this case we do not have to depend on typological evidence alone to explain an isolated "survival," nor are we faced with a temporal hiatus of more than 7,000 years, for it is the earliest Eskimo stage, the Ipiutak, that shows the closest resemblances, with side-bladed lance heads and arrowheads directly comparable with those of the European Mesolithic and Siberian Neolithic. These do not occur in later stages of Eskimo culture, though side blades on harpoon heads, which were also present in the Ipiutak,

continued into the Old Bering Sea, Birnirk, Punuk, and Dorset.

The knives with rows of stone side blades that are found at prehistoric Eskimo sites in Smith Sound, West Greenland, and Southampton Island (Wissler, 1918: 120–125; Boas, 1907: fig. 178), and at old Thule sites around Hudson Bay (Mathiassen, 1927, **2**: 70), undoubtedly stem from the same tradition; and though knives with multiple blades are not known in Alaska, it seems reasonable to include Old Bering Sea and Ipiutak specimens with a single blade of this kind (Collins, 1937: pl. 38, figs. 2–4; Rainey, 1941*b*: pl. 3, fig. 6). Examples of Neolithic and Eskimo knives with lateral blades are shown in fig. 3. The Old Bering Sea and Ipiutak knives with their rather large blades were succeeded by a Thule-Punuk type with a slightly curved handle and much smaller blade of stone or metal (Collins, 1937: pl. 78, figs. 1–3; Mathiassen, 1927, **2**: 69), a type which, as Mathiassen has shown, is the prototype of the modern Eskimo "crooked knife."

To the south of the Eskimo area knives with a single side blade are found at protohistoric Mandan sites (Brower, 1904: xviii), in the Promontory culture of Utah (Steward, 1937: fig. 32, f), and at prehistoric mound and cave sites in Montana (Mulloy, 1942: figs. 24, *26*, 38, *10*).[5] The close resemblance of these protohistoric and prehistoric Indian knives to those of the Eskimo, and the strong probability that they are later at least than the Old Bering Sea and Ipiutak examples, would seem to point to their northern (Eskimo) origin. Wissler first pointed out the resemblance between the Mandan and Eskimo side-bladed knives and recognized that the iron-bladed Eskimo crooked knife had been derived from such a form. Because of the supposed absence of the crooked knife and its stone-bladed prototype in Greenland and the Hudson Bay region, Wissler felt (1923) that the original stone-bladed form had been invented by "a Canadian [Indian] tribe, many centuries ago, and had . . . spread to Alaska on the one hand and to Dakota on the other." However, Wissler underestimated the distribution of these knives, for the modern crooked knife and the earlier stone-bladed form both occur in the Central regions and Greenland, as well as in Alaska. The distribution of side-bladed knives from one end of the Eskimo territory to the other, and their occurrence in the oldest known Eskimo horizons, constitute sufficient evidence of their antiquity in the far north; while the occurrence of similar knives and other side-bladed implements in a Mesolithic-Neolithic setting in the Old World reveals the ultimate origin of this typical Eskimo cutting implement.

Okladnikov's division (1938) of the Lake Baikal Neolithic into separate stages, though presented as yet only in summary form, is a valuable contribution to the prehistory of that important area. The cultural inventories of the earlier Baikal stages are of particular interest in that they provide the first opportunity to make direct comparisons with prehistoric culture stages in America, and thus to examine critically the claim that the basic American culture was derived from the Baikal region.

Six culture stages preceding the Iron age are recognized by Okladnikov on the basis of recent excavation of graves and habitation sites on the Angara River and elsewhere in the Baikal region. The stages are designated as the Khinski, Isakovski, Serovski, Kitoiski, Glazkovski, and Tiverski. Okladnikov does not describe the oldest stage, the Khinski, stating that it has not been sufficiently studied. We are not told whether it correlates with the lowest (eleventh) stratum at Ulan-Khad, which according to Petri (1916: 115) was the only one which lacked pottery. At any rate, pottery is present in all of the stages described by Okladnikov.

The early inhabitants of the Baikal area were hunters, fishers, and food-gatherers who lived in (permanent?) settlements along the rivers and lakes. In the three earliest (Neolithic) stages, hunting was a more important occupation than fishing. The fauna included only existing species.

The last two stages, the Glazkovski and Tiverski, belong to the Bronze period. Glazkovski traits include bone daggers and armor of "Paleoasiatic" type made of bone plaques—specific Alaskan Eskimo types that appeared on St. Lawrence Island in the Punuk stage. The preceding Baikal stage, the Kitoiski, is late Neolithic. Deposits of red ochre accompany the Kitoiski burials; and the circle-and-dot design, a typical Punuk element, makes its appearance. Fishing was of more importance than hunting during the last three stages.

[5] The side-bladed swords or clubs of the Aztecs, though showing a certain typological resemblance to some of the multiple-bladed Eskimo lances or knives (*e.g.*, fig. 1, *g*) were functionally different and probably unrelated to the side-bladed implements under discussion.

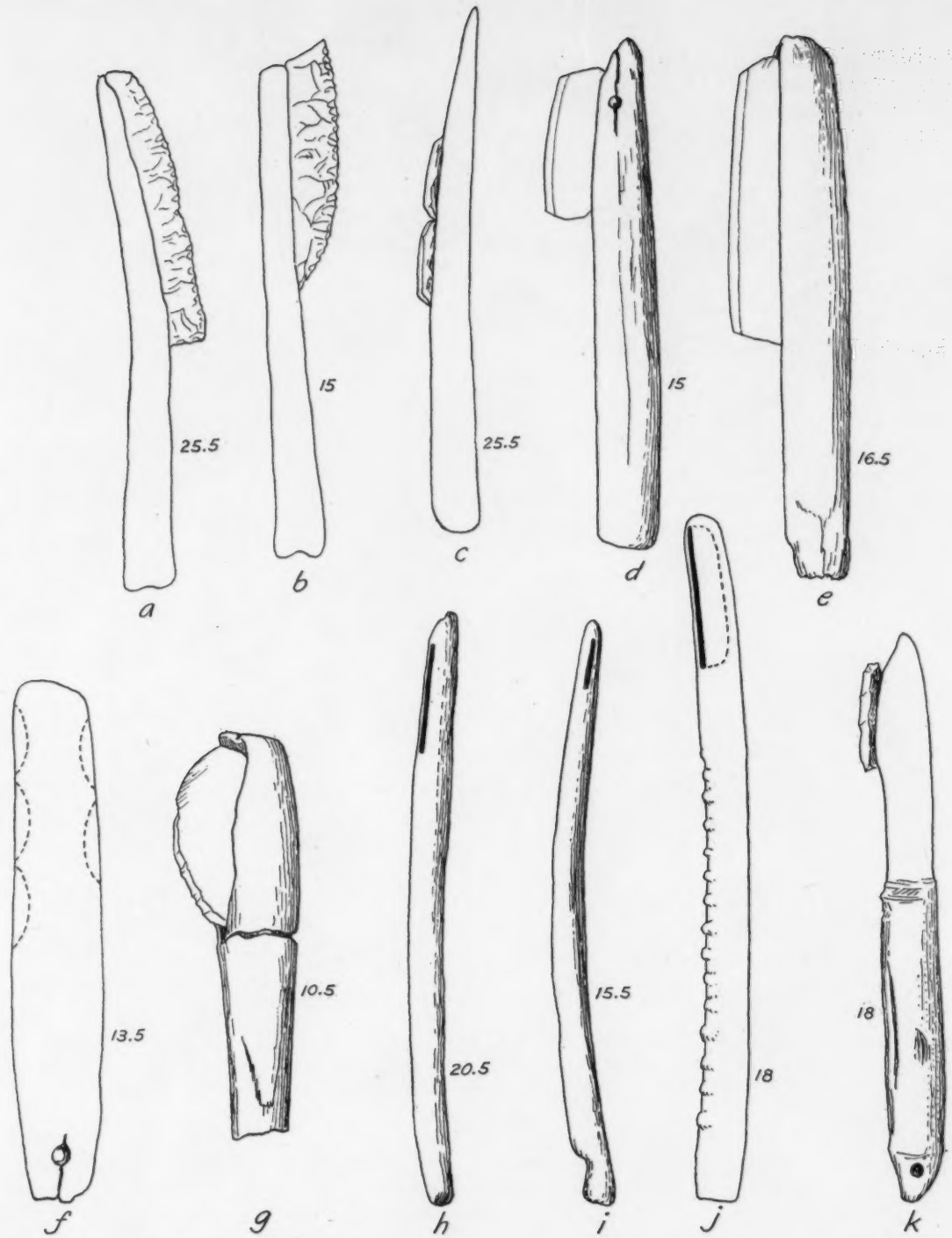


FIG. 3. Side-bladed knives—Neolithic and Eskimo. *a*, *b*, Ponomarevsk, Angara River, and Shishkinsk, Lena River, Siberia, after Okladnikov (1938: fig. 3, *7*, and fig. 5, *2*); *c*, Chu Chia Chai, Hsi Ning River, Kansu, China, after Andersson (1934: pl. 24, *1*); *d*, *e*, St. Lawrence Island, Alaska (Old Bering Sea culture), after Collins (1937: pl. 38, *2*, *3*); *f*, Qilalukan, Ponds Inlet, Baffin Land (Thule culture), after Mathiassen (1927, **1**: pl. 46, *9*); *g*, Ponds Inlet, after Boas (1907: fig. 179); *h*, Naujan, Repulse Bay, Melville Peninsula (Thule culture), after Mathiassen (1927, **1**: pl. 18, *4*); *i*, St. Lawrence Island, Alaska (Punuk culture), after Collins (1937: pl. 78, *1*); *j*, Northeast Greenland, after Thomsen (1917: fig. 26); *k*, Disko Bay, West Greenland, after Porsild (1915: fig. 41, E). (Not to scale; figures indicate approximate length in centimeters.)

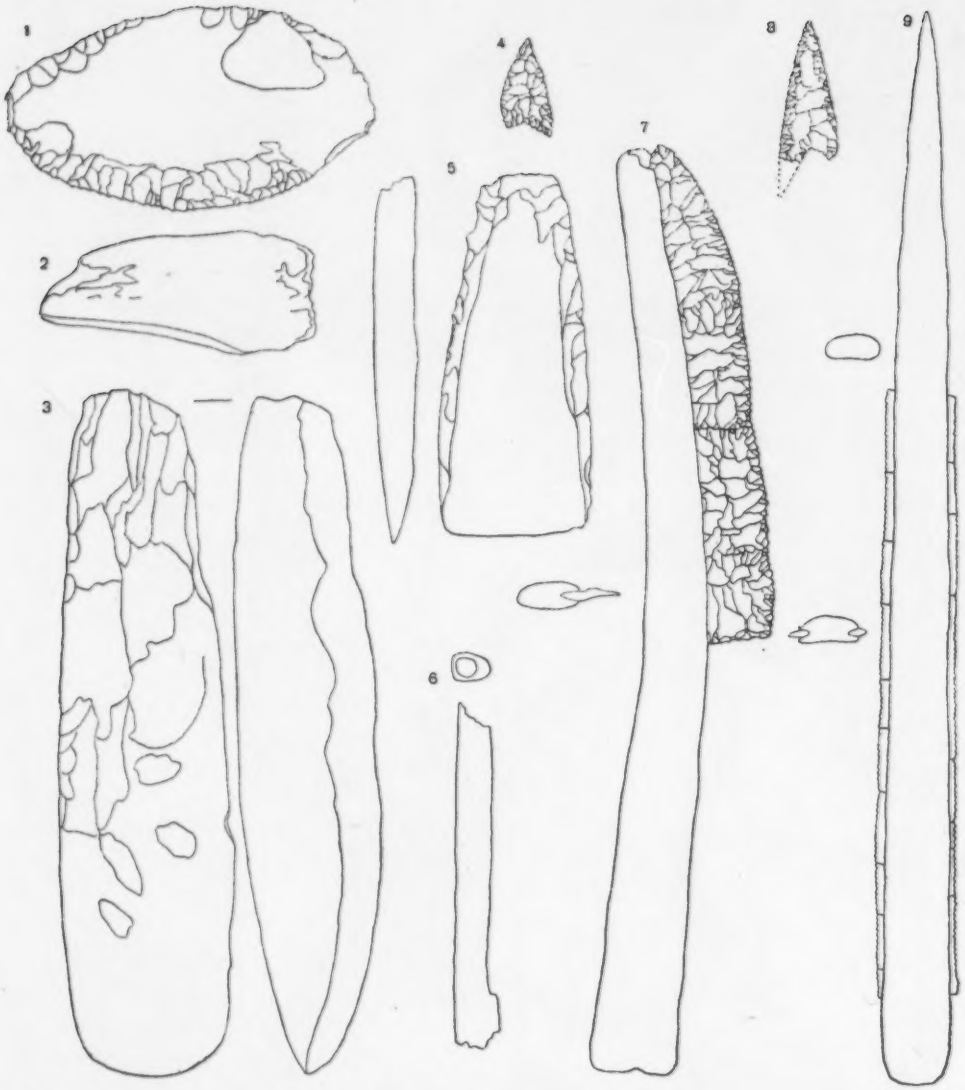


FIG. 4. Implements of Isakovski stage, early Neolithic, Lake Baikal region. After Okladnikov (1938: fig. 3). 1, scraper; 2, jade knife; 3, stone adz; 4, 8, flint arrow points; 5, stone adz; 6, needlecase made of bird bone; 7, knife with inserted blades; 9, bone spear head with inserted blades.

Figures 4 and 5 are reproductions of Okladnikov's figures 3 and 5, and illustrate the more important elements of the two oldest described Baikal stages, the Isakovski and Serovski. The polished stone adz (fig. 4, *3*) and the side-bladed knife and lance (fig. 4, *7*, *9*) are comparable with Ipiutak implements described by Rainey (1941*b*: pl. 6, *15*; pl. 3, *2–6*). The use of the bow in the Isakovski stage is indicated by the presence of small arrow points. The two examples shown by Okladnikov (fig. 3, *4*, *8*) are unlike the few arrow points from Ipiutak illustrated by Rainey. However, we do not know the complete range of either the Ipiutak or Isakovski forms, and as Petri, Vitkovsky, Tolmachev, and Prokoshev all illustrate small chipped arrow points from other Neolithic sites directly comparable with some of Rainey's, they may also have been present in the Isakovski stage. Other Isakovski implements described by Okladnikov are stone scrapers, crescent-shaped jade and schist knives, needles, needlecases, awls, pottery vessels with conical

bases, and ornaments of boars' tusks and reindeer teeth. Except for the last-mentioned, all of these elements are present in prehistoric Eskimo culture. With the exception of the scrapers, however, they are not suggestive of the older culture horizons in the United States, those in which remains of extinct animals are found.

The next oldest stage, the Serovski (fig. 5),

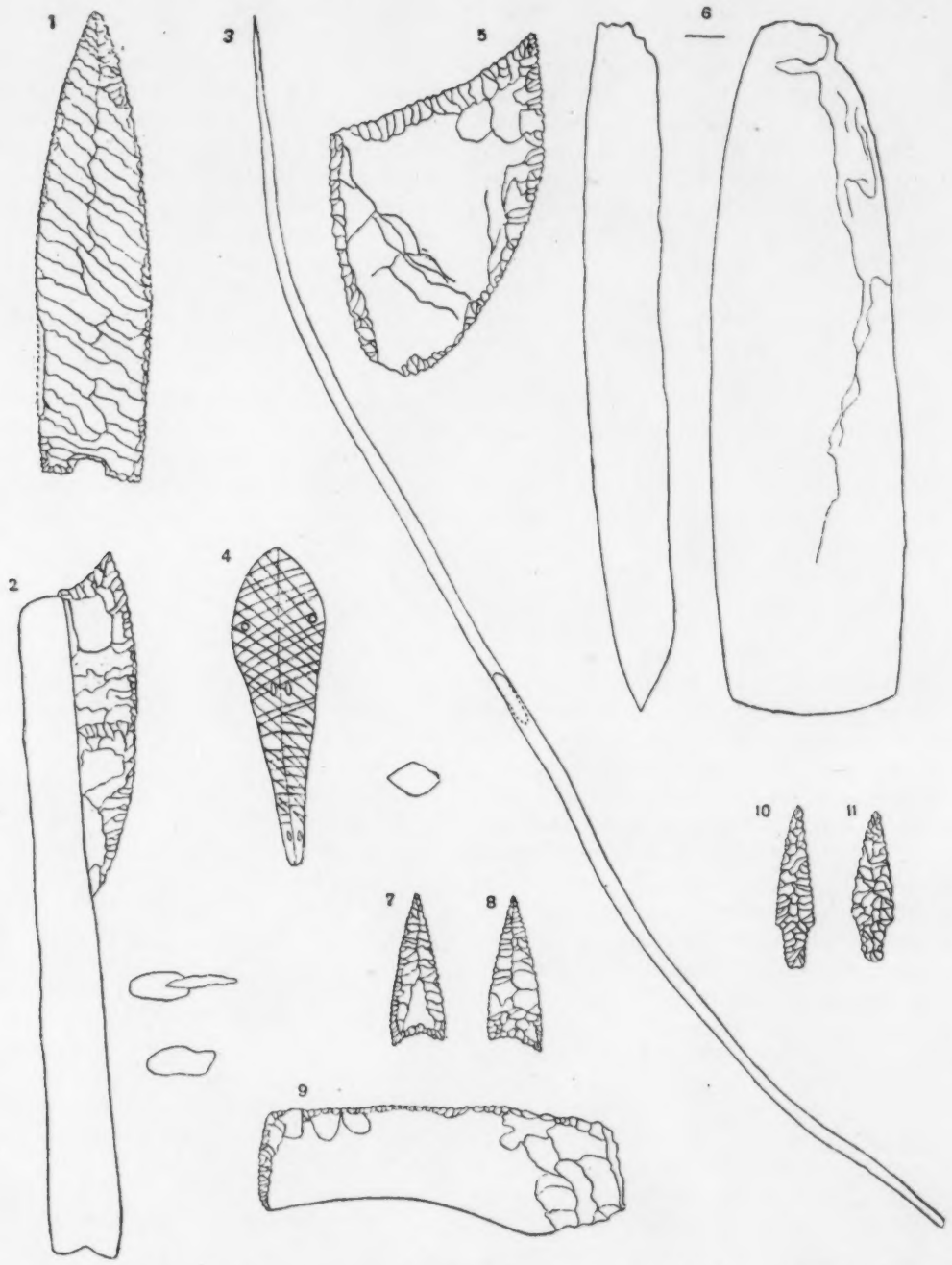


FIG. 5. Implements of Serovski stage, early Neolithic, Lake Baikal region. After Okladnikov (1938: fig. 5). 1, flint spear head; 2, bone knife with inset flint blade; 3, bone reinforcements for a bow, greatly reduced; 4, fish figurine, marble; 5, knife blade; 6, adz, green jade; 7, 8, 10, 11, flint arrow points; 9, knife, schist.

is described as closely related to the Isakovski, the only notable omission being the side-bladed lances. One of the chipped stone blades (fig. 5, *1*) resembles the generalized Yuma, as Clark has pointed out (1940). Additional Serovski types are long wooden bows with bone reinforcements, barbed fish spears (?), pottery vessels with rounded bottoms, stone figurines representing fish and other animals, shell beads and various ornaments of shell, jade, and other stone. Of this group only the stone figurines and shell objects are not typically Eskimo.

The dating of the Lake Baikal Neolithic is somewhat uncertain. In his paper describing the remains, Okladnikov expresses no opinion as to their age, though he speaks (1938: 248) of the Isakovski stage as coinciding with the European Mesolithic and as reflecting traditions from the upper Paleolithic of Siberia. In a later, more general paper (1941)[6] he states that the Baikal series covers a period approximately from the sixth millennium to the tenth century B.C., but the basis of the dating is not given. Clark (1940) regards the Lake Baikal remains as related to but later than the European Mesolithic. He describes the stage of culture they represent as "modified Mesolithic," because unlike the Maglemose—which is assigned to the Boreal (Period II), 6800–5000 B.C.—it is infused with late Neolithic elements. As Clark remarks, the term "modified Mesolithic" as indicating a basically Mesolithic way of life might in some parts of Europe and Asia be extended to include even Bronze age groups. In the Lake Baikal region Okladnikov's clear-cut distinction between the several culture stages removes this uncertainty and shows that, so far as material equipment is concerned, it is only the earliest Baikal stages that have definite Mesolithic affinities. The published information on the Baikal Neolithic is still too meager to permit final determination of its age in relation to the better-known European Mesolithic, though the present evidence suggests that it is later. The stone industries of the two cultures, for instance, are markedly different. The Baikal implements as a whole, and particularly the characteristic small, finely chipped and symmetrical arrow points, are much closer to Eskimo and American Indian types than to any pre-Neolithic types in the Old World. These delicately chipped symmetrical blades are completely foreign to the European Mesolithic, the most characteristic Maglemose types being asymmetrical microliths and burins which, as Clark (1936) points out, are obviously of upper Paleolithic origin. There are also close affinities between Maglemose and upper Paleolithic art (Clark, 1936: 162 ff.).

It will be observed that there is a difference of some 6,000 years between the age Okladnikov assigns to the earliest Lake Baikal Neolithic and that tentatively suggested for the earliest known Eskimo remains. On this scale the Baikal remains would also be some 3,500 years older than the late Neolithic Yang Shao culture of north China. Okladnikov's maximum date of 6000 B.C. presumably applies only to the earliest but as yet undescribed Baikal stage, the Khinski, and we do not know how much older this may have been than the two succeeding stages, the Isakovski and Serovski. It must be admitted that the Eskimo resemblances we have discussed could be more reasonably explained if the antiquity of these two stages were considerably less than the maximum estimate for the entire series.

Okladnikov has also described (1936; 1941; Field and Prostov, 1942) the Amur Neolithic and emphasized its separateness from that of the Baikal region. Though the Amur material has not been presented in such a way as to facilitate direct comparisons with early Eskimo, it would be surprising if cultural resemblances of some kind did not exist. Rainey suggests a relationship between the spirally carved ivory objects found at Ipiutak and the spiral designs so typical of the Amur region, and there is reason to believe that some connection between Old Bering Sea and Amur art might be proved if the archaeological materials from the latter region were better known (Collins, 1937: 296–301). However, the influences that may have reached Bering Strait from eastern Asia were probably later than those which emanated from the Baikal region. Indeed, the possibility cannot be excluded that in some instances elements of northern origin may have spread southward along the Asiatic littoral, for though northern Alaska is a marginal area geographically, it was also a center of vigorous culture development some 2,000 years ago.

The Lake Baikal Neolithic, on the other hand, is undoubtedly much older than Ipiutak or Old Bering Sea—even though it may not have quite the antiquity Okladnikov claims for it—and consequently there can be no question of the direction of the culture drift. Despite the 3,000 miles

[6] For a lengthy English summary of this, see Field and Prostov (1942).

between Bering Strait and the Angara River, the Baikal culture appears to have been one of the principal sources from which Eskimo culture sprang. We thus have striking confirmation of Hatt's theory (1916; 1934) of the derivation of Eskimo culture from early groups of peoples in Eurasia who, lacking the snowshoe, lived along inland waterways which they followed to the coasts. Okladnikov's description of the early Neolithic inhabitants of the Baikal region gives us a picture of such an inland population, and the evidence presented by Zolotarev shows that in later Neolithic times, but before the intrusion of the nomadic reindeer-breeders, the coasts and rivers of northern Siberia continued to be occupied by more or less isolated and sedentary groups whose underground houses, pottery,[7] and hunting and fishing techniques were essentially Eskimo in character (Zolotarev, 1938*a*, 1938*b*; Collins, 1937: 382, and 1941: 541, 587; Jenness, 1941: 393).

Resemblances Between Eskimo and Upper Paleolithic Cultures

The clear indications that prehistoric Eskimo culture is fundamentally related to Mesolithic-Neolithic horizons in northern Eurasia[8] raise again the old question of its affinities with the European Paleolithic. The discovery of the Old Bering Sea and Ipiutak cultures in Alaska and the better understanding we now have of the early Neolithic remains around Lake Baikal provide the two lines of evidence essential to a full consideration of the problem. These are: (1) segregation of the demonstrably ancient elements in Eskimo culture, and (2) knowledge of early Siberian cultures intermediate in time and space between the European Paleolithic and the Eskimo.

De Laguna's penetrating analysis (1932–1933) of Eskimo and Paleolithic art shows that while in some respects the two styles are very different, the possibility of a genetic relationship cannot be denied. She emphasizes the significant fact that the geometric art of the Paleolithic has the characteristics of youth; that it is fluid and unorganized in contrast to Thule and modern Eskimo art which is rigid and stylized. The content of the two styles is actually very similar; the differences are mainly those of application and arrangement. "The chief differences between Eskimo and Paleolithic art are those between age and youth, and are perhaps what we should have expected, were Eskimo art derived from that of the Paleolithic" (De Laguna, 1933: 100). When De Laguna wrote, there was no knowledge of the earliest stage of Old Bering Sea art, that which I have designated (1937: 46, 91) as style 1, nor had Dorset art been universally recognized as an older style than Thule in the Central area. Old Bering Sea style 1, though it employed most of the elements common to later Eskimo art, was simpler and more diffuse. Like the Dorset, it was essentially a linear style, characterized principally by a profusion of radiating lines, lines with short or long oblique spurs, and detached lines; broken lines and circles were also employed. The ornamentation was usually applied in a more or less random manner, and in total appearance bore little resemblance either to the elaborate curvilinear designs of developed Old Bering Sea art or to the straightened and formalized line and spur ornamentation of the modern Eskimos. This glimpse of Eskimo art in its incipiency shows us a style that in the somewhat casual and free application of its motives, and to a certain extent in the motives themselves, seems significantly similar to Upper Paleolithic and the closely related Maglemose art. Demonstration would require more extended treatment than can be given here. I believe it to be true, however, as I have stated before (1937: 295–296; 1941: 585–586), that the simple and often rather "scratchy" ornamentation of Old Bering Sea style 1 and Dorset bears a closer resemblance to Paleolithic and Maglemose geometric art, which was equally simple and variable, than to later styles in either America or Eurasia.

[7] The absence of pottery at Ipiutak is puzzling but probably of no far-reaching chronological significance, since it was present in late Mesolithic and early Neolithic times in northern Eurasia. Pottery is found at all Old Bering Sea sites, and also in some old middens at Point Hope that are probably related in some way to Ipiutak (Rainey, 1941*b*: 368).

[8] The elements constituting the oldest Eskimo cultures are by no means all traceable to a remote Old World origin. The elaboration and complexity of the Old Bering Sea and Ipiutak show that Bering Strait was a region of high culture intensity. A peculiarly favorable environment—one of the great hunting territories of the world—fostered the richest and most vigorous development of culture that has ever appeared in the Arctic regions. Many of its elements, we know, were of local origin; and there is no reason to suppose that any large segments of the culture, for instance its unique and highly developed art complex, were brought in from some unknown outside source. It is the basic elements underlying the superstructure of local development with which we are concerned, and these are unmistakably of Old World origin (Collins, 1937: 381–383).

Sollas (1915) has called attention to a number of cultural resemblances between Eskimo and Upper Paleolithic. While these are rather impressive in a cumulative sense, they carry less conviction when examined separately. Some of the objects compared are of a simple, generalized character, some are of uncertain function, and others are types that we now know to be recent in Eskimo culture. The few that occur in the older stages of Eskimo culture—*e.g.*, needlecases, spear-throwers, stone lamps—seem too widely distributed to be indicative of specific or exclusive relationship.

If we confine our attention to Eskimo types of proved antiquity, we see that while these have a wide and often sporadic distribution in northern Eurasia, there are only two settings, the Siberian Neolithic and the European Mesolithic, in which any considerable number of them are found together. As we have already observed, every important element of the Isakovski and Serovski stages has its general counterpart in prehistoric Eskimo culture. Eskimo and Mesolithic affinities are fewer, as might be expected in two cultures so widely separated in time and space, but they seem significant.

The side-bladed projectile points and knives of the Maglemose have already been mentioned. They have been emphasized because I feel that they constitute stronger evidence of an Eskimo-Mesolithic relationship than any other single feature. They are complex in form, and their geographical and temporal distribution is significant, being restricted to the Mesolithic of Europe, the related Neolithic of Siberia, and the oldest stages of Eskimo culture in America. Other resemblances are pottery lamps and steep-sided, conical-based cooking pots (in the Ertebølle stage), barbed bone fish and bird spears, and art (Clark, 1936: figs. 41, 53, 59–62, pl. 7). Of the Maglemose fish and bird spear points which Clark illustrates (1936: fig. 41), practically all can be duplicated in prehistoric Alaskan collections except nos. 9–12B, which types, as Clark shows later (1938), do not belong to the Maglemose but to the earlier Arhensburg culture.

Since the Mesolithic rests on an Upper Paleolithic foundation, Eskimo culture might, in an indirect sense, be traced in part to that remote period. The relationship with the Mesolithic, however, is more direct, and we are on firmer ground in seeking the origin of perhaps the greater part of Eskimo culture in this later stage which, though it carried on certain Paleolithic traditions, had already adapted itself to a changed environment and spread over the forested plains as far east as Lake Baikal.

Conclusion

There is still a considerable time interval between the oldest Eskimo cultures and the Siberian Neolithic. This probably means that somewhere to the north or east of Lake Baikal are the undiscovered remains of the immediate ancestors of the Eskimos. Dwelling along the rivers and lakes of the forest zone, then gradually extending their settlements to the shores of the Arctic and Bering Sea, these precursors of the Eskimos carried on a Mesolithic-Neolithic way of life long after it had been discontinued in other regions. At Bering Strait an abundant food supply (walrus, seals, caribou, birds, fish) and generally favorable living conditions brought a sudden efflorescence of culture. Influences from the higher cultures of eastern Asia were probably felt, and these, blended with the rich local growth rooted in the old Mesolithic-Neolithic tradition, produced the complex Eskimo cultures we know as Ipiutak and Old Bering Sea.

If the Baikal culture was in part ancestral to that of the Eskimo, what was its status in relation to American culture generally? Since the older American cultures are known for the most part only from their lithic content, we must refer again to the Baikal implements. Unfortunately, we do not know the full range of types characteristic of the earlier Baikal stages. Petri's illustrations, reproduced here in fig. 1, are not segregated chronologically; there can be no certainty that all of these belong to the older stages. However, Okladnikov definitely assigns the concave-based and tanged arrow points to the Isakovski and Serovski stages (fig. 4, *4*, *8*, and fig. 5, *7*, *8*, *10*, *11*); and Vitkovsky, Prokoshev, and Tolmachev illustrate narrow, straight-based and round-based types from other Neolithic sites whose general content indicates approximate contemporaneity with Okladnikov's early Baikal sites. We may assume, therefore, that at least such types of Petri's as those reproduced here in fig. 1, *1–41*, *56*, *63*, *74*, *81–84*, are characteristic of the early Baikal Neolithic.

As was pointed out earlier, some of these types occur in all of the older stages of Eskimo culture —Ipiutak, Old Bering Sea, Kachemak Bay, Dorset, Greenland "Stone Age." This can hardly be said for early non-Eskimo cultures in America.

Figure 1, *34*, resembles Signal Butte 1, and several of those with tapering tangs are faintly suggestive of Gypsum Cave. However, it will be observed that these intergrade into other types, so that they could be explained as forms that might naturally appear in any series as large and as variable as this. American archaeologists will recognize many familiar forms among these Baikal arrow points. There is probably none that is not typically American, but the majority seem definitely characteristic of recent rather than older horizons.

We have yet to consider the Yumalike blade from the Serovski stage (fig. 5, *1*). We do not know whether this is a unique specimen, and hence of somewhat dubious value, or whether it is typical of the early Baikal Neolithic. In view of the accumulating evidence that Yuma is considerably later than Folsom, not to mention Sandia, a Yuma-Baikal relationship, even if proved, would not indicate that the Siberian Neolithic was ancestral to American culture generally. There is nothing in the lithic industry of the Baikal Neolithic suggestive of Folsom or Sandia, and some of the other Baikal traits—pottery, polished stone adzes, the reinforced bow, and some types of finely chipped arrowheads—seem strange possessions of a culture supposedly ancestral to these.

The fact that the Siberian Neolithic has close affinities with the oldest Eskimo cultures and none with those of demonstrable antiquity in other parts of America, would suggest that Ipiutak and Old Bering Sea are considerably later than Folsom and Sandia. This is a conclusion to which we would be forced on other grounds. Though the Alaskan excavations of the past 15 years have shown that prehistoric Eskimo culture was more elaborate than that of today, the total picture is one of broad cultural continuity. There is no sharp break between the prehistoric and the modern. Some Eskimo middens show continuous occupancy from the earliest known period to the end of the nineteenth century; one of the oldest sites, that on Little Diomede Island, is still occupied. Previous indications that the earliest known stages of Eskimo culture are hardly more than 2,000 years old are reinforced by the discovery of Ipiutak, which exhibits features reminiscent of Chinese culture of post-Shang times.

Two other lines of evidence indicate that the Eskimos entered America in relatively recent times. These are the locations of their settlements and the faunal content of the middens. At the Lindenmeier site and Sandia Cave it is certain that physiographic changes of considerable magnitude have occurred since these stations were occupied. At Bering Strait no such changes have taken place within the period of Eskimo occupancy, those that have been noted being of a minor and purely local character. The location of even the oldest Eskimo sites along existing shore lines shows that they were established when the relation of sea to land was essentially the same as today. Any older sites, established when the sea-level was lower, as it was during glacial and postglacial times, would now be under water.

Moreover, we know from the bones in the middens that the land and sea animals hunted by the ancient Eskimos were those still living in the region. Yet the frozen muck in the immediate vicinity of the Eskimo sites and in the adjacent interior yields abundant remains of a Pleistocene fauna of which the ancient Eskimos had no knowledge, regardless of how late the fauna may have persisted. The incontestable evidence that these same extinct animals were hunted by Folsom and Sandia man would seem to afford conclusive proof, if such were needed, of the great gap between the earliest Americans and the Eskimos.

Bibliography

Andersson, J. G. 1934. Children of the yellow earth. New York.

Berkey, Charles P., and N. C. Nelson. 1926. Geology and prehistoric archaeology of the Gobi Desert. *Am. Mus. Novitates* 222.

Bessels, Emil. 1879. Die amerikanische Nordpol-Expedition. Leipzig.

Birket-Smith, Kaj. 1929. The Caribou Eskimos. *Rept. Fifth Thule Exped. 1921–24*, **5**. Copenhagen.

Boas, Franz. 1907. Second report on the Eskimo of Baffin Land and Hudson Bay. *Bull. Am. Mus. Nat. Hist.* **15**, pt. 2.

Brower, J. V. 1904. Mandan. *Mem. Exploration Basin Mississippi* **8**, St. Paul.

Clark, J. G. D. 1936. The Mesolithic settlement of Northern Europe. Cambridge.

—— 1938. Reindeer hunting tribes of Northern Europe. *Antiquity* **12** (46): 154–171.

—— 1940. New World origins. *Antiquity* **14** (54): 117–137.

Collins, Henry B., Jr. 1935. Archeology of the Bering Sea region. *Ann. Rept. Smithsonian Inst.* 1933: 453–468.

—— 1937. Archeology of St. Lawrence Island, Alaska. *Smithsonian Misc. Coll.* **96** (1).

—— 1941. Outline of Eskimo prehistory. *Smithsonian Misc. Coll.* **100**: 533–592.

CURWEN, E. CECIL. 1941. Some food-gathering implements: a study in Mesolithic tradition. *Antiquity* **15** (60): 320–334.

FIELD, HENRY, AND PROSTOV, EUGENE. 1942. Results of Soviet investigations in Siberia, 1940–1941. *Am. Anthropologist* **44** (3): 388–406.

HATT, GUDMUND. 1916. Moccasins and their relation to Arctic footwear. *Mem. Am. Anthropol. Assoc.* **3** (3).

—— 1934. North American and Eurasian culture connections. *Proc. Fifth Pacific Sci. Cong., Canada, 1933*, **4**: 2755–2765.

HIBBEN, FRANK C. 1941. Evidences of early occupation in Sandia Cave, New Mexico, and other sites in the Sandia-Manzano region. *Smithsonian Misc. Coll.* **99** (23).

HOWARD, E. B. 1935. Evidence of early man in North America. *Univ. Mus. Jour.* **24** (2/3): 61–176.

HRDLIČKA, ALEŠ. 1937. Archeological explorations on Kodiak and the Aleutian Islands. *Expl. and Fieldwork Smithsonian Inst.* 1936: 57–62.

JENNESS, DIAMOND. 1923. Origin of the Copper Eskimos and their copper culture. *Geog. Rev.* **13** (4): 540–551.

—— 1928. Ethnological problems of Arctic America. *Am. Geog. Soc. Special Publ.* 7: 167–175.

—— 1933. The problem of the Eskimo. In: The American aborigines, their origin and antiquity, pp. 373–396. Toronto.

—— 1941. Prehistoric culture waves from Asia to America. *Ann. Rept. Smithsonian Inst.* 1940: 383–396.

JOCHELSON, WALDEMAR. 1928. Archaeological investigations in Kamchatka. Carnegie Inst. Washington Publ. 388.

KINDLE, E. M. 1909. Notes on the Pt. Hope spit. *Jour. Geology* **17**: 178–189.

LAGUNA, FREDERICA DE. 1932–1933. A comparison of Eskimo and Palaeolithic art. *Am. Jour. Archaeol.* **36** (4): 477–551, 1932; **37** (1): 77–107, 1933.

—— 1934. The archaeology of Cook Inlet, Alaska. Philadelphia.

LAUFER, BERTHOLD. 1912. Jade. A study in Chinese archeology and religion. *Field Mus. Nat. Hist., Anthropol. Ser., Publ.* **10**, 154.

MADSEN, A. P. 1873. Antiquités préhistoriques du Danemark. Copenhagen.

MATHIASSEN, THERKEL. 1927. Archeology of the Central Eskimos. *Rept. Fifth Thule Exped. 1921–24*, **4**. Copenhagen.

—— 1930. Inugsuk, a mediaeval Eskimo settlement in Upernivik District, West Greenland. *Meddelelser om Grønland* **77**.

MULLOY, WM. 1942. The Hagen site, a prehistoric village on the lower Yellowstone. *Univ. Montana Publ. Social Sci.*, no. 1.

NAKAYAMA, EIJI. 1934. Neolithic remains from the western coast of Kamchatka Peninsula. (In Japanese.) *Jour. Anthropol. Soc. Tokyo* **49** (564): 375–388.

Nelson, N. C. (See Berkey, C. P., and N. C. Nelson.)

OKLADNIKOV, A. P. 1936. On the archeological explorations of the Amur region in 1935. (In Russian.) *Soviet Archeology*, no. 1: 275–278.

—— 1938. Archeological data on the ancient history of the Lake Baikal region. (In Russian.) *Rev. Ancient Hist.* [Moscow] 1 (2): 244–260.

—— 1941. Neolithic monuments as sources for the ethnogeny of Siberia and the Far East. (In Russian.) *Kratkie Soobshcheniia* [Moscow], no. 9: 5–14.

PETRI, B. E. 1916. Neolithic finds on the shore of Baikal. Preliminary report on the excavation of the Ulan-Khad site. (In Russian.) *Publ. Mus. Anthropology and Ethnography, Imper. Acad. Sci.*, Petrograd, **3**: 113–132.

PORSILD, MORTEN P. 1915. Studies on the material culture of the Eskimo in West Greenland. *Meddelelser om Grønland* **51**: 113–250.

PROKOSHEV, N. A. 1940. Results of investigations of late Neolithic sites in the region of the mouth of Chusov River (1934–1937). (In Russian.) *Bull. Commission Étude Quaternaire*, nos. 6–7: 78–81.

RAINEY, FROELICH G. 1941*a*. Eskimo prehistory: the Okvik site on the Punuk Islands. *Anthropol. Papers Am. Mus. Nat. Hist.* **37**, pt. 4.

—— 1941*b*. The Ipiutak culture at Point Hope, Alaska. Am. Anthropologist **43** (3), pt. 1: 364–375.

—— 1941*c*. Mystery people of the Arctic. *Nat. Hist.* **47** (3).

ROBERTS, FRANK H. H., JR. 1940. Developments in the problem of the North American Paleo-Indian. *Smithsonian Misc. Coll.* **100**: 51–116.

SCHNELL, IVAN. 1932. Prehistoric finds from the island world of the Far East. *Mus. Far Eastern Antiquities* [Stockholm] *Bull.* 4.

SOLBERG, O. 1907. Beiträge zur Vorgeschichte der Osteskimo. *Skrifter Vid.-Selsk. Christiania* 1907, Hist.-Filos. Kl., no. 2.

SOLLAS, W. J. 1915. Ancient hunters and their modern representatives. London.

SPINDEN, HERBERT J. 1937. First peopling of America as a chronological problem. In: Early Man (edited by George Grant MacCurdy), pp. 105–114. Philadelphia.

STEFANSSON, VILHJALMUR. 1914. The Stefansson-Anderson Arctic Expedition of the American Museum. *Anthropol. Papers Am. Mus. Nat. Hist.* **14**, pt. 1.

STEWARD, JULIAN H. 1937. Ancient caves of the Great Salt Lake region. *Bur. Am. Ethnol. Bull.* 116.

STRONG, W. D. 1935. An introduction to Nebraska archeology. *Smithsonian Misc. Coll.* **93** (10).

THALBITZER, WILLIAM. 1914. The Ammassalik Eskimo. *Meddelelser om Grønland* **39**, pt. 1.

THOMSEN, THOMAS. 1917. Implements and artifacts of the North-East Greenlanders. *Meddelelser om Grønland* **44**: 359–496.

TOLMACHEV, VLADIMIR. 1913. Antiquités du versant est des Monts ourals. (In Russian.) *Bull. soc. ouralienne amis sci. nat.* **32**, pt. 2: 195–225.

TORII, R. 1919. Les Ainou des Isles kouriles. *Jour. Coll. Sci., Imper. Univ. Tokyo* **42**, art. 1.

VEBAEK, C. L. 1938. New finds of Mesolithic ornamented bone and antler artifacts in Denmark. *Acta Archaeologica* **9**, fasc. 3: 205–223.

VITKOVSKY, N. I. 1881. Brief account of the excavation of a Stone Age burial site in the Province of Irkutsk, in July 1880. (In Russian.) *Bull. East Siberian Section, Imper. Russian Geog. Soc.* **11** (3/4): 1–12.

—— 1882. Account of burial places of the Stone Age in the Province of Irkutsk on the left bank of the Angara River, in the summer of 1881. (In Russian.) *Bull.*

East Siberian Section, Imper. Russian Geog. Soc. **13** (1/2): 1–36.

WEYER, EDWARD M., JR. 1930. Archeological material from the village site at Hot Springs, Port Möller, Alaska. *Anthropol. Papers Am. Mus. Nat. Hist.* **4**.

WILSON, THOMAS. 1899. Arrowpoints, spearheads, and knives of prehistoric times. *Rept. U. S. Nat. Mus.* 1897: 811–988.

WINTEMBERG, W. J. 1939. Eskimo sites of the Dorset culture in Newfoundland. *Am. Antiquity* **5** (2): 83–102.

WISSLER, CLARK. 1918. Archeology of the Polar Eskimo. *Anthropol. Papers Am. Mus. Nat. Hist.* **22**, pt. 3.

—— 1923. The story of the crooked knife. *Nat. Hist.* **23** (2): 159–161.

WONG, K. C. 1932. Ancient Chinese jades. *China Jour.* **16** (2): 59–62.

ZOLOTAREV, A. M. 1938*a*. A study in the history of mutual ethnical relations in the northeast of Asia. (In Russian.) *Rep. State Pedagogic Inst. City of Voronezh* **4**: 73–87.

—— 1938*b*. The ancient culture of North Asia. *Am. Anthropologist* **40** (1): 12–23.

RESULTS OF RECENT ARCHAEOLOGICAL RESEARCH IN THE NORTHERN GREAT BASIN REGION OF SOUTH CENTRAL OREGON

L. S. CRESSMAN

Department of Anthropology, University of Oregon

(*Read April 23, 1942*)

The purpose of this paper[1] is to present a summary of results in the more important phases of the archaeological research carried on under the writer's direction in south central Oregon and northeastern California. This work began with a survey of petroglyphs in 1932 (Cressman, 1937). The survey extended into 1934, and the first small excavations were made that year (Cressman, 1936). Excepting 1936, annual field sessions were carried out through 1940. In 1940 excavations were carried out in the Lower Klamath Lake bed in northeastern California and in caves along the shore line of Tule Lake a few kilometers south and east. Materials subsequently excavated from other sites along the Tule Lake shore line and from Massacre Lake Cave in northwestern Nevada by Mr. and Mrs. Frank A. Payne, of Klamath Falls, were made available for study. Materials from the Humboldt Cave, north of Lovelock Cave in northwestern Nevada, were made available by Dr. Robert F. Heizer and the Museum of Anthropology of the University of California. Other materials used in the studies and for plotting the distributions were either examined personally in museums or derived from the literature.

I shall present first a brief statement of the geological characteristics of the area, then our results bearing on the study of Early Man, and thirdly a discussion of the cave deposits later than those associated with an extinct fauna. Finally I shall present the implications for temporal and spatial relationships with adjacent areas as indicated by present information.

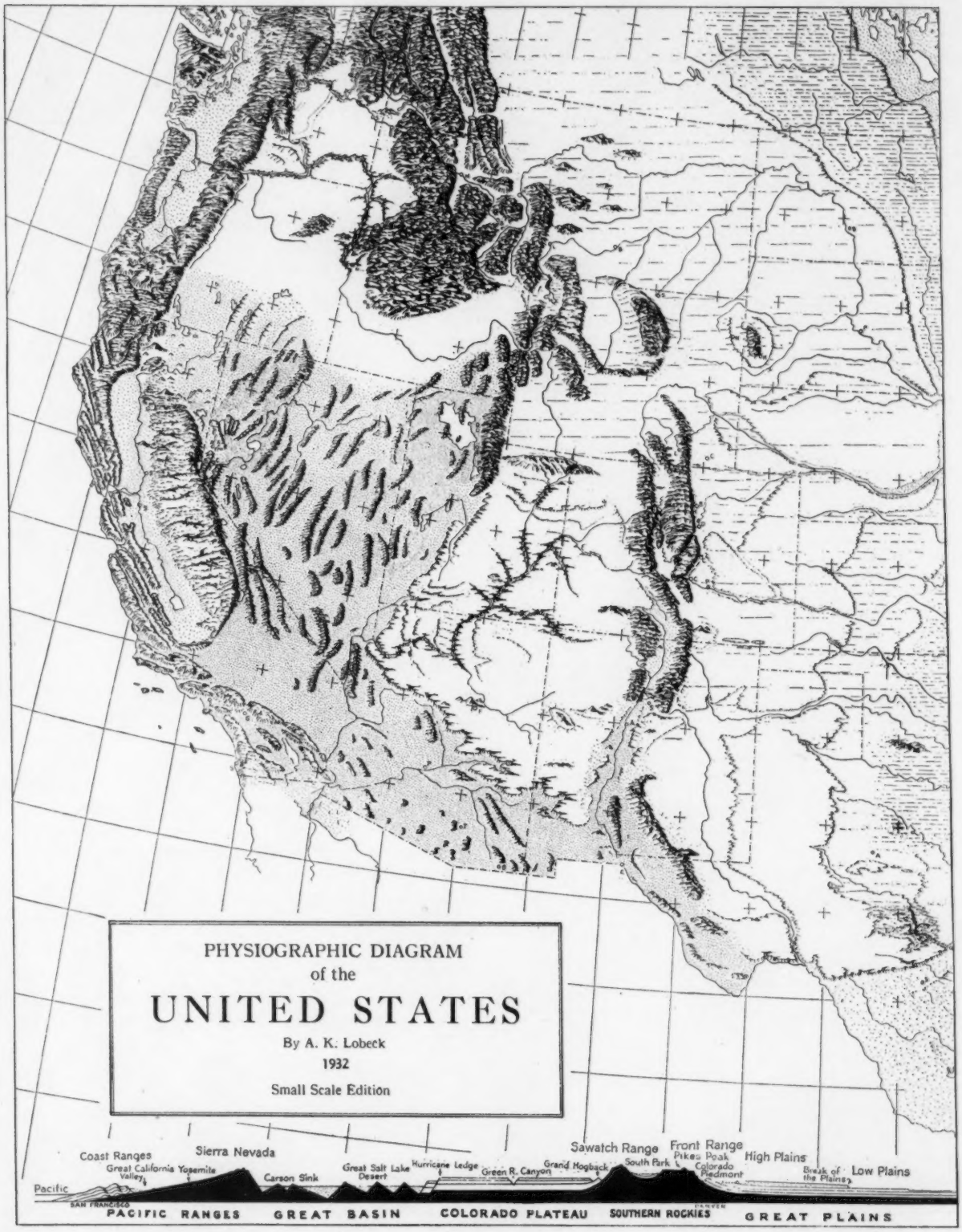
[1] Grateful acknowledgment is made for grants-in-aid from the Penrose Fund of the American Philosophical Society, from the Social Science Research Council, from the Carnegie Institution of Washington, and from the General Research Council of the Oregon State System of Higher Education. A Guggenheim Memorial Foundation Fellowship in 1940–41 with sabbatical leave from the University of Oregon made possible the study of collections in different museums and the preparation of a detailed report, Publication 538 of the Carnegie Institution of Washington.

Geological Characteristics

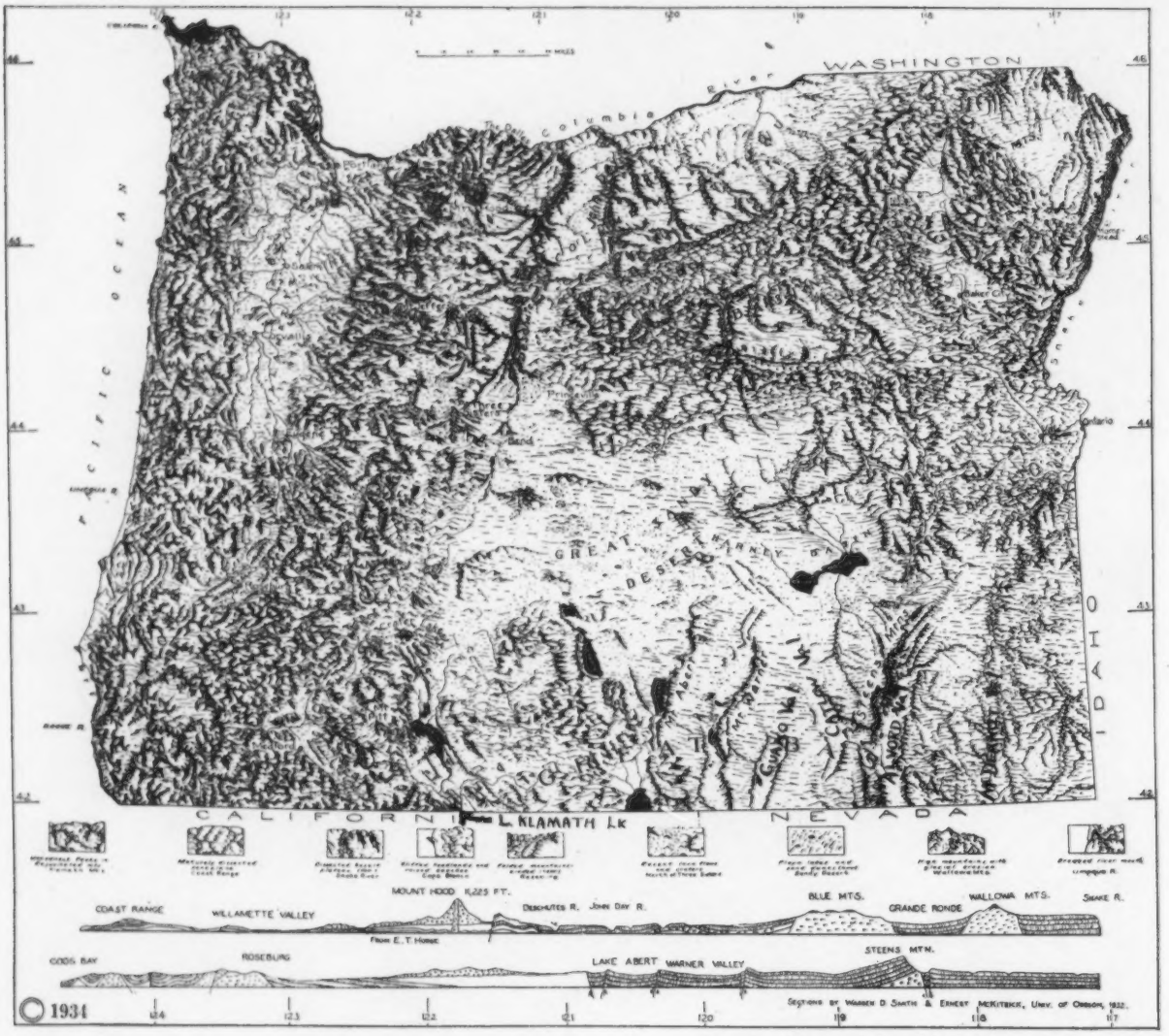
South central Oregon lies in the extreme northern extension of the Basin and Range province (map 1). It is characterized by the usual arid climate and great extremes of temperatures. Yucca and creosote bush of the south give way to sage and rabbit brush as the dominant shrubs. The high plateaus are dotted with juniper and occasionally some ponderosa pine. The Upper Sonoran life zone is the most extensive, followed by the Transition. Others are found, including the Arctic-Alpine on Steens Mountain (Bailey, 1936). The typical north-south orographic structure of the Basin is pronounced.

From the Cascade Mountains on the west to the southeastern part of the state there are seven fault basins averaging about 1,500 m. or more in elevation (map 2). On either side is a high tableland extending usually to 2,000 m. or more in height, and in some cases these are cut again by transverse faults (Cressman, 1936: 9–15, pl. 2). In some cases high mountains separate the fault valleys, for example Steens Mountain, having an elevation of over 3,000 m., between Catlow and Alvord Valleys; Beatty's Butte and Lone Grave Butte, approximately 2,025 and 2,000 m., respectively; and the Warner Mountains between Warner Valley and Goose Lake. The fault basins in the Pleistocene were great lakes, as the beaches and terraces show. They are now dry with the exception of Klamath Lake in the west, which, while part of the fault system, is not a true basin lake. Along the top terraces of these lakes wave-cut caves and shelters were available as habitations for man as the water level receded. These caves are cut in the walls or scarps of the great Tertiary lava flows which cover the earlier sediments of much of eastern Oregon.

Two of the caves in the Summer Lake area, excavated in 1938, showed geological stratification: in each cave were two layers of occupational debris separated by an unbroken stratum of



MAP 1. Physiographic diagram of the western United States. (Reproduced, with permission, from *Physiographic Diagram of the United States* by A. K. Lobeck (1932), small scale edition.)



Reproduced by permission of A. J. Nystrom & Co., Chicago.

MAP 2. Physiographic diagram of Oregon. (After Smith and Raymond.)

pumice (Cressman, Williams, and Krieger, 1940). This pumice Dr. Howel Williams was able to identify as having come from the explosion which destroyed Mount Mazama, some 60 miles to the west in the Cascades, forming the crater in which Crater Lake now lies. After extensive studies, Williams has put a minimum date of 5,000 years ago and a maximum of 10,000 on the deposition of the pumice. Using this minimum, which seems to be more nearly correct, we have a frame of reference for dating our Oregon cave materials and relating them to those of other areas.

EARLY MAN

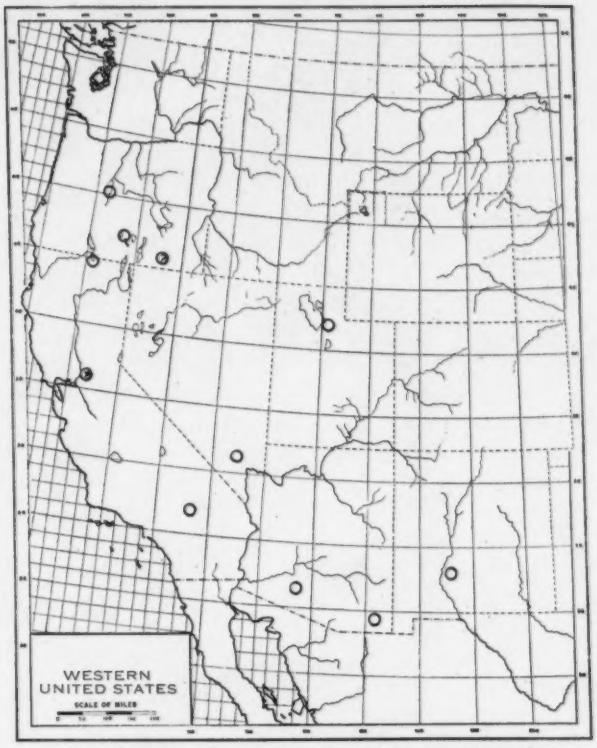
Two sites have furnished undoubted evidence of the association of man and an extinct fauna. The first is a shelter or cave in this stratified series. Here under nearly 7 feet of debris were found worked obsidian, bones broken for their marrow, others crudely worked, fire lenses, and the remains of *Equus*, camel, and other genera, some of which are no longer found in the area, in addition to an avifauna indicative of a moister climate than at present. These rested in the sand and gravels of an old beach. Over this was a considerable bed of fine dust and roof debris,

the upper portion of which gave the appearance of having been deposited in a dry cycle. Above this was a bed of Mount Mazama pumice; and on this, debris containing ash lenses and other evidence of human habitation but lacking artifacts. The period of earliest occupation would be associated with the time when the lake was in a process of receding from its maximum, probably in the latter part of the last Pluvial 10,000 or more years ago. The type of animal remains shows that the lake must have provided forage and water. To do this the climate would have had to be moister than it is now (Cressman, 1939: 315–316; 1940: 301–302; 1941: 174–175).

The second site is a lake bed, the Lower Klamath Lake. Here an association was established with *Equus*, camel, and some kind of proboscidean. Since these remains all occur around the lowest elevation in the lake bed, at two localities, we have inferred that they were left by animals coming to a waterhole. This would have been the case in the Early Postpluvial, probably toward the end, sometime between 10,000 and 7,500 years ago. The Pleistocene fauna is lacking in our middle horizon, dating from the early Late Postpluvial, and apparently the extinction of this fauna occurred in this area sometime in the late Early Postpluvial or early Middle Postpluvial (Cressman, 1940).

The third case is another cave, Catlow Cave No. 1, but the evidence is not conclusive. The reader is referred to the discussion of this site (Cressman, Williams, and Krieger, 1940: 6–10; Cressman, 1941: 169–172; Cressman, 1942).

The culture of this period in both cave and lake bed is based on both a hunting and a gathering economy. Folsom and Yuma points are lacking. It is apparently related to the Cochise culture and represents an inter-montane migration from the north rather than a trans-montane as recently suggested by Antevs (Sayles and Antevs, 1941: 55), since Cochise artifacts are lacking in Folsom sites and the reverse is true. See map 3 for distribution.



Reproduced by permission of A. J. Nystrom & Co., Chicago.

MAP 3. Sites of early man west of the Rocky Mountains.

LATER CAVE DEPOSITS

The deposits in the geologically stratified caves showed no difference in type of artifact in the two levels, only more numerous specimens above the pumice. The pumice shower was but an event in the life of the caves' occupants. The caves farther east were out of the pumice area and thus lack geological stratification, but while the cultural remains are of the same kind as those in the stratified caves, they are more numerous. In the eastern caves, those in Catlow Valley, there was an early period lacking basketry but having matting. Twined basketry in fully developed form and intricate in structure appears suddenly, as though brought by a migrating people (Cressman, Williams, and Krieger, 1940: 17–18). In the Fort Rock Cave, in the northwestern part of the area, there was stratification by pumice; but this came from the Newberry Craters, and being hot when it fell, reduced all inflammable material under it to a charred state. The date of this is later than the Mount Mazama eruption, but Williams says that it is probably several thousand years old (Cressman, Williams, and Krieger, 1940: 78).

Cultural stratification is also shown in the caves in the gradual change from the atlatl to the bow and arrow, with an overlapping period when both were used (Cressman, Williams, and Krieger, 1940: 47). Then, too, coiled basketry appears near the end of occupation of the Catlow Valley caves but not in the others (Cressman, 1942).

Because of the detailed analysis of technological features presented elsewhere (Cressman, 1942), I shall limit this part of the paper to a statement of general descriptive features and distribution.

Atlatls

Atlatls are of two and possibly three types. Two complete ones were found in Roaring Springs Cave in the middle of the basketry bed. These are unique among this type of weapons (Cressman, Williams, and Krieger, 1940: 16–49). They are the male variety with a broad shaft, and the spur is part of the instrument. The proximal half of a third atlatl was found in the back dirt of a looted cave, and is apparently similar to the southwestern type. The third type would seem to have had the spur as a separate piece of bone, which was set into the distal end of the shaft as in the Eskimo weapon. This theory is based upon the finding of a bone object which was possibly used for this purpose. The nearest approximation to the two perfect Oregon specimens is one found in Lovelock Cave, now unfortunately lost (Loud and Harrington, 1929: 100, fig. 16).

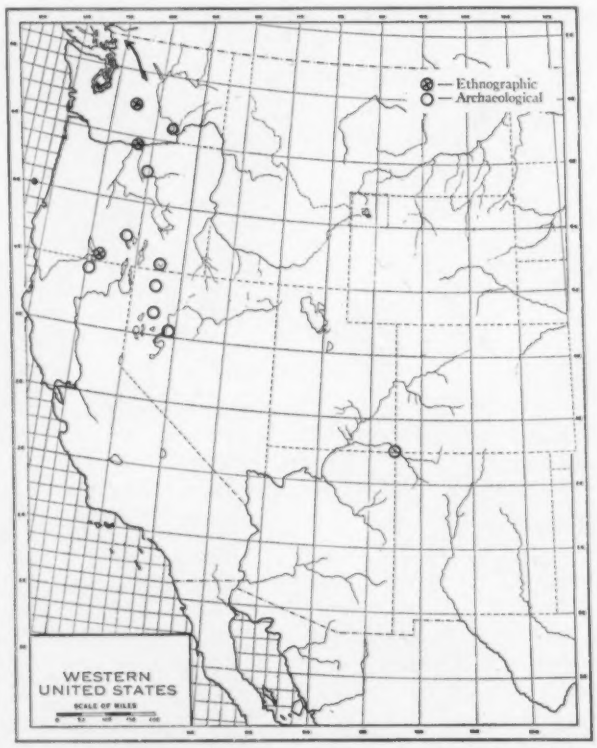
Twined Basketry

Twined basketry, like coiled, must be analyzed in terms of structure. These traits are texture, pitch of stitch, type of warp and weft, method of starting, method of adding new warps, method of finishing, and methods of decoration. To these should be added design patterns. Materials used are of little significance as compared with structural features. The materials will affect mainly the texture of the basket and ease of manipulation. Guernsey and Kidder's (1921) analysis of Basket Maker bags set a standard for this type of work, but almost no one has followed it. Weltfish (1930, 1932), though concentrating mostly on coiled basketry, has applied the same thorough techniques of analysis to a limited amount of twining. The great majority of pieces of our Oregon cave basketry are a single type with few variations in technical details. We have called it Catlow Twine. It is a semiflexible ware with both warp and weft made from 2-ply twisted tule (*Scirpus lacustris*), with the pitch of the stitch down to the right. New warps are added by simple insertion. The rims are mostly finished by having the warp trimmed flush with the top of the last twining row. Occasionally the warp is bent back at the rim and inserted in the adjoining weft stitch for binding. Warps in baskets from a cave in the Tule Lake region just over the California line use a loop method of insertion of warps but are otherwise typical Catlow Twine (Cressman, 1942). The usual method of starting is to lay two warps side by side, but neither one long enough to reach to the rim. These are bound by the first loop of the weft, which then proceeds in the weft circuits. Additional warps are inserted as needed to increase the size of the basket. Another method of starting, however, uses a bundle of warps and then subdivides them progressively. Decoration is applied by use of plain and wrapped twined overlay, false embroidery, the use of dyes, and variation in the structural features, such as changing the pitch of the stitch and the use of twilled twining (Cressman, 1942).

Distributions

Twined Basketry

The major technical features of Catlow Twine occur in Massacre Lake Cave, Tule Lake Caves, Early Lovelock, being limited to the Early period



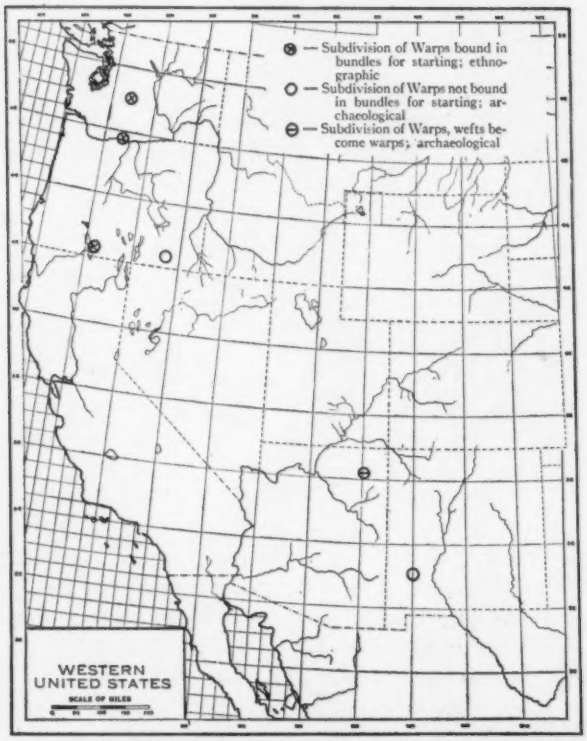
Reproduced by permission of A. J. Nystrom & Co., Chicago.

Map 4. Distribution of twined basketry, showing basic elements of Catlow Twine.

and perhaps early Middle, at Wahluke in Washington, and in the Basket Maker bags (map 4). The last is a highly developed type which has added certain refinements of starting, warp additions, and rim finish (Guernsey and Kidder, 1921). Many of the same features are found ethnographically in the Columbia Plateau among the Tlingit of the Northwest Coast, and unless we have rim or bottom it is impossible to distinguish fragmentary pieces of modern Klamath-Modoc ware from Catlow Twine. The chief variations in the Basket Maker and Catlow Twine methods of starting are in the former's use of warps running to the rim (Cressman, 1942).

Bundle of Warps Method of Starting

This occurs in Basket Maker II and III bags of northeastern Arizona, possibly in one Catlow Cave specimen of soft materials from Roaring Springs Cave, and ethnographically among the Klamath-Modoc, the Columbia Plateau, and some Tlingit baskets. The Basket Makers modified this method by twining some of the wefts into warps (Cressman, 1942). See also map 5.


— Subdivision of Warps bound in bundles for starting; ethnographic
— Subdivision of Warps not bound in bundles for starting; archaeological
— Subdivision of Warps, wefts become warps; archaeological
WESTERN UNITED STATES
SCALE OF MILES

Reproduced by permission of A. J. Nystrom & Co., Chicago.

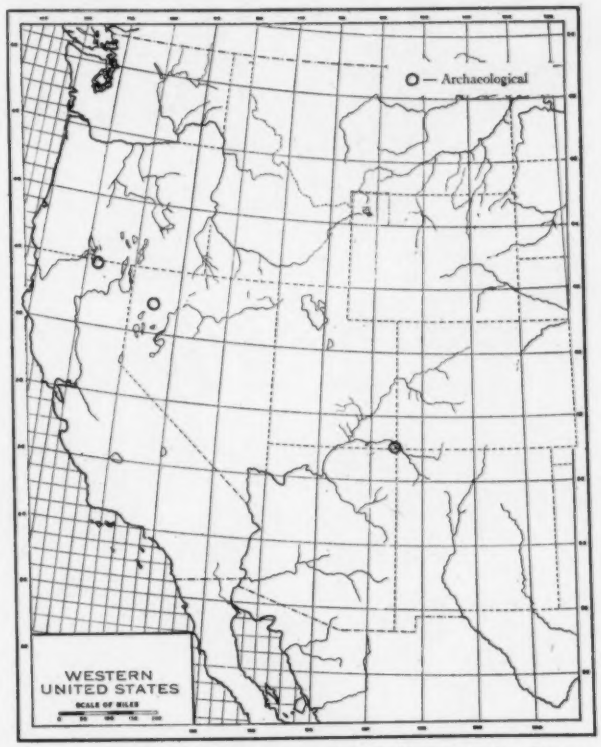
MAP 5. Distribution of bundle of warps method of starting.

Methods of Adding New Warps

Simple insertion is most commonly used, is most widespread, and is probably the oldest. It has little diagnostic utility.

Looped Warp Method

This occurs in the Basket Maker II bags (Guernsey and Kidder, 1921: 68–69, pl. 27a–b), and in a modified form in Humboldt Cave in northeastern Nevada (Cressman, 1942) and in Tule Lake baskets which are otherwise straight Catlow Twine ware (Cressman, 1942). See map 6.



Reproduced by permission of A. J. Nystrom & Co., Chicago.

MAP 6. Distribution of looped warp method of adding new warps.

Subdivision of Warp Bundles

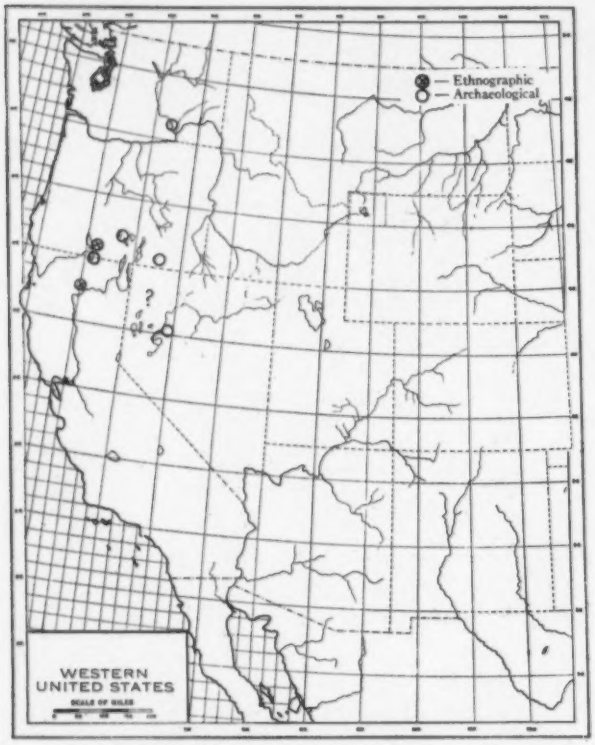
This occurs in one late Catlow Valley specimen, in Basket Maker II and III bags using the bundle of warps method of starting, and ethnographically among the Klamath-Modoc, the Columbia Plateau, and the Tlingit (Cressman, 1942).

METHODS OF DECORATION

One- and two-strand twined overlay visible on both surfaces of the basket occurs most fre-

quently. The overlay strand is usually *Xerophyllum* but sometimes may be dyed to contrast a dark decorative element against a light background.

This occurs in the Oregon caves, Massacre Lake Cave, Early Lovelock, Wahluke, Tule Lake, and ethnographically among the Pitt River tribes, the northern Wintu, and the Columbia Plateau (Cressman, 1942). See map 7.



Reproduced by permission of A. J. Nystrom & Co., Chicago.

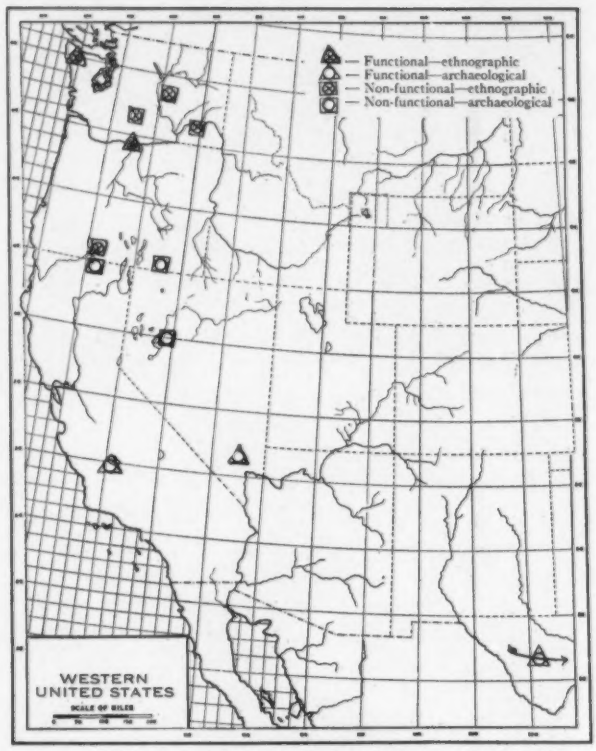
MAP 7. Distribution of plain twined overlay.

Wrapped Twined Overlay

This is found in the Oregon caves, Massacre Lake Cave, Early Lovelock, Tule Lake Caves, Wahluke, and ethnographically among the Klamath-Modoc, and in the Columbia Plateau. Since it is purely decorative, it is different from the wrapped twining which is used as the structure of the basket which is found in the Puget Sound area, the Wishram of the Columbia River, at Buena Vista Lake, California, and in a slightly variant form in Gypsum Cave and in the Big Bend of Texas (Cressman, 1942). Map 8.

False Embroidery

Found in the Oregon caves, the Columbia Plateau tribes, and the Tlingit (Cressman, 1942). Refer to map 9.



Reproduced by permission of A. J. Nystrom & Co., Chicago.

MAP 8. Distribution of wrapped twined overlay and wrapped twining.

Variation in Pitch of Stitch for Decoration

Found in Basket Maker II bags and Humboldt Cave. Ethnographic occurrences in the Basin are probably due to lack of conventionalization of techniques (Cressman, 1942). Map 10.

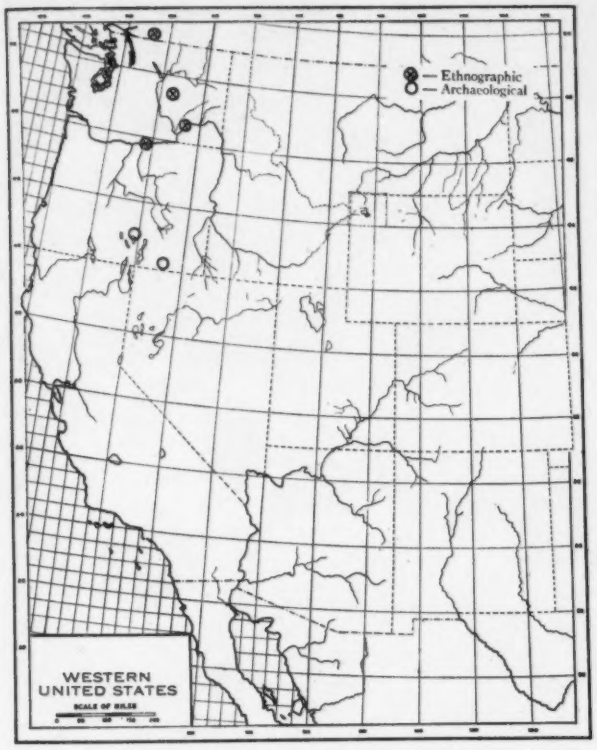
Contrasting Colors of Wefts

This is essentially a Basket Maker technique, but the results are the same as in the use of simple one-strand overlay or two-strand with contrasting colors. Technologically the Basket Maker technique is a great improvement over the twined overlay (Cressman, 1942).

Design Patterns

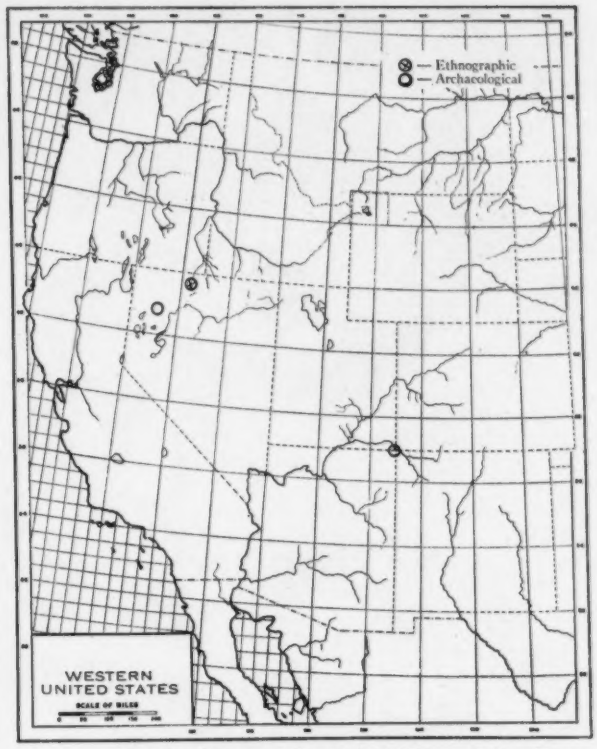
The Oregon craftsman saw his basket as a decorative field consisting of a series of horizontal bands or zones. Vertical patterns are not used. The zonal pattern is a characteristic feature of Basket Maker bag designs. The Columbia Plateau peoples used both zonal and vertical patterns with emphasis on the former. The Tlingit used zonal patterns (Cressman, 1942).

Beading, or the use of alternating positive and



Reproduced by permission of A. J. Nystrom & Co., Chicago.

MAP 9. Distribution of false embroidery.



Reproduced by permission of A. J. Nystrom & Co., Chicago.

MAP 10. Distribution of variation in pitch of stitch.

negative designs, or contrasting colors such as tan and red or red and black, is strikingly developed among the Basket Makers. It is one of the most frequently used design techniques of Catlow Twine, but here it is produced by manipulation of overlay.

Guernsey and Kidder (1921: 74) call attention to the practice of the Basket Makers in painting designs on some of their bags with identical designs on both surfaces of the basket, and infer, quite properly it seems to me, that this represents a survival of a previous practice in basketry decoration in which the design showed on both surfaces. This postulated condition is provided by the use of plain twined overlay such as we have in the Oregon caves and the related horizons from Early Lovelock and Wahluke.

Coiled Basketry

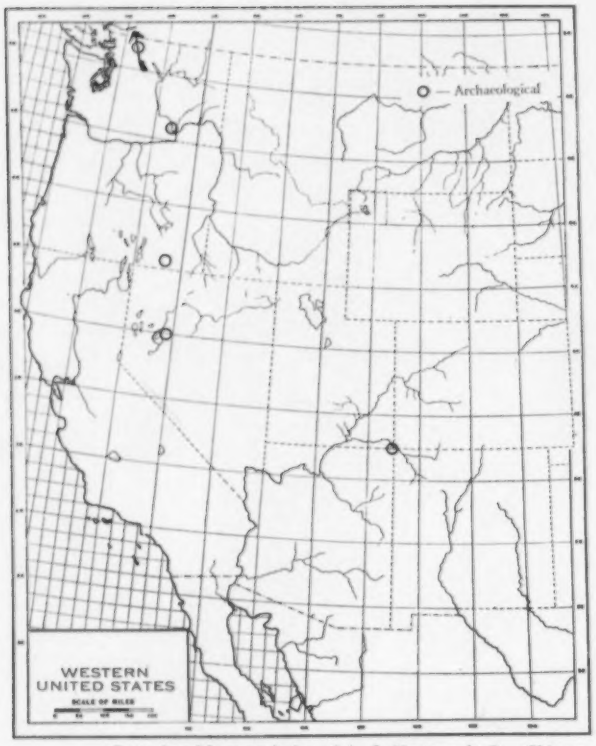
Only twelve fragments come from the Oregon caves and probably two of these come from the same basket. They come from the surface and just under it in two caves. There are two main types, although some fragments may represent a third or variations of the two basic types (Cressman, 1942).

One-rod with Interlocking Stitch

This occurs also in the Transitional Lovelock, at Wahluke, and appears in Basket Maker II sites. Weltfish (1932) in her preliminary study felt that this was intrusive in Basket Maker II, but a more extensive study by Morris (Morris and Burgh, 1941) shows that it is a well-established type. Its distribution is northerly, being found in Alaska and among the Paleo-Siberian tribes and possibly farther into Asia (Cressman, 1942). Map 11.

Three-rod Triangular

With plain or split stitch it is found in Oregon and throughout the deposits of Lovelock; it occurs in Late Lovelock with interlocked stitches and at Wahluke. The Basket Makers use a 2-rod-and-bundle triangular with a plain stitch which must be thought of as structurally the same as the 3-rod. In the Basket Maker, the Oregon, and ethnographic sites in the Southwest, the work surface is the convex, and the direction of work is clockwise, while the concave work surface and counter-clockwise direction is preferred at Lovelock and Wahluke (Cressman, 1942).



Reproduced by permission of A. J. Nystrom & Co., Chicago.

MAP 11. Distribution of one-rod coiling with interlocking stitch.

L-shaped Scapula Awls

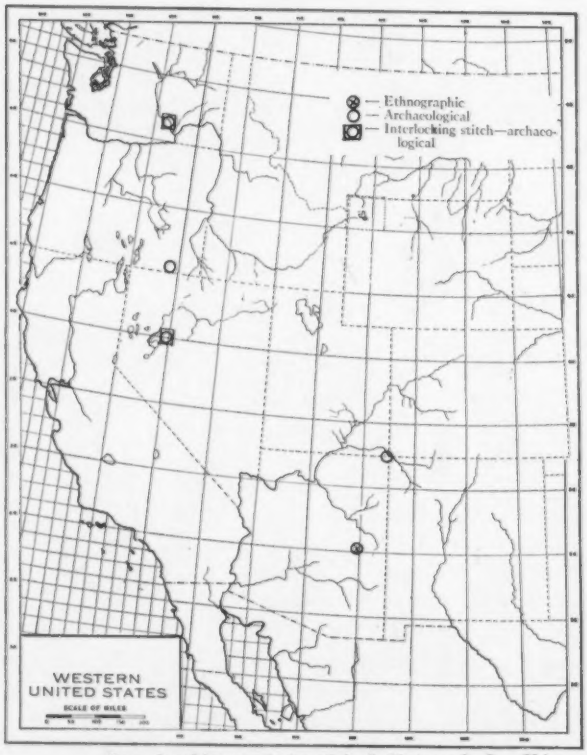
These awls made from the edge of the scapula of a large mammal are unusual and have a high diagnostic value (Cressman, 1942). They were found in large numbers in Early and Transitional Lovelock (Loud and Harrington, 1929), late Oregon, at Deadman Cave in north central Utah in Level III (Smith, 1941), estimated at from 1,500 to 3,000 years ago, in a Basket Maker II site in a tributary of the Segi, and in sites in Grand Gulch and Cottonwood Canyon attributed to Basket Maker horizons (Cressman, 1942). They have also been collected from Abert Lake in south central Oregon, from Umatilla County in northern Oregon and from the Columbia River in Washington about 40 miles above its confluence with the Snake, but in the last three cases the provenience is uncertain (Cressman, 1942). Map 13.

CHRONOLOGY AND RELATIONSHIPS

The distribution of Catlow Twine basketry, 1-rod coiling with interlocking stitch, and 3-rod triangular with non-interlocking stitch, and the L-shaped scapula awls indicates that the Late Oregon cave culture corresponds to the Early and early Middle Lovelock. Lovelock Cave also showed the same change from the atlatl to the bow and arrow as the Oregon caves. The distributions of these different traits, as we have just shown, strongly indicate a connection between the Oregon – northwestern Nevada area and the Four Corners in archaeological horizons, with a persistence of many of the traits into modern times in the Columbia Plateau and in British Columbia. This was a non-ceramic area, and basketry in those areas where native life could survive played a role in many ways similar to that of pottery in the Anasazi culture.

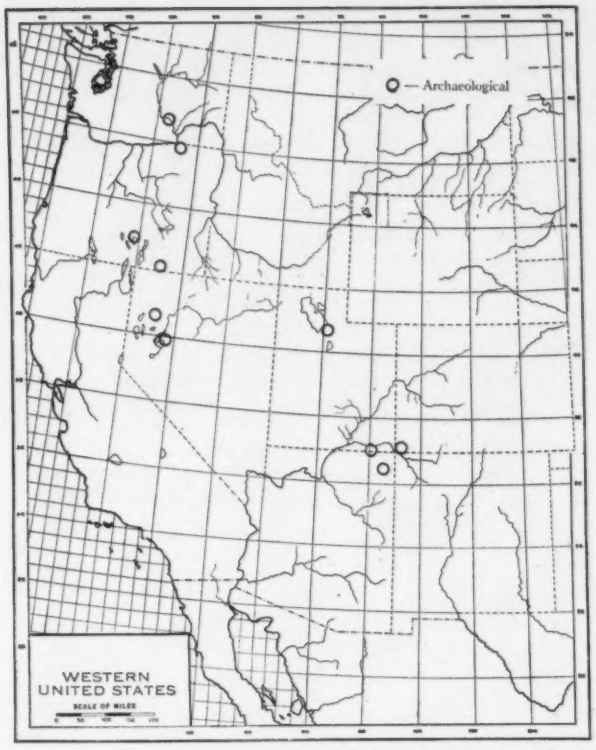
If our geological chronology is to be relied upon, and I see no reason why it is not, then the Oregon caves and Early and early Middle Lovelock periods are antecedent to the Classical Basket Maker. The fact that so many traits are shared would indicate some connection. In view of the implications of the time element two possibilities exist.

First, the Oregon-Nevada materials are in a direct line of origin of the early Anasazi, repre-



Reproduced by permission of A. J. Nystrom & Co., Chicago.

MAP 12. Distribution of three-rod triangular with plain and interlocking stitch.



Reproduced by permission of A. J. Nystrom & Co., Chicago.

MAP 13. Distribution of L-shaped scapula awls.

senting the remains of an intermontane diffusion that broke against the forbidding Nevada deserts and spread out along the east-west line of the Humboldt River, with one line eventually going into California and the other into Utah and to the south. Local variations continued to develop as long as climatic conditions were favorable.

Second, the Oregon-Nevada traits and those of the early Anasazi represent end products of two lines which branched off from a northern parent stem at some time and place unknown. The similarity in traits would represent the survival of parent traits and perhaps some diffusion, and the local characteristics would be the result of local specialization brought about through adaptation to different ecological conditions and the chances of history. Until some of the gaps in our knowledge are filled in, it would be unwise to be more precise in any suggestions of relationships.

REFERENCES

ANTEVS, E. 1925. On the Pleistocene history of the Great Basin. Carnegie Inst. Washington Publ. 352. Washington: 51–114.

—— 1935. Correlations of late Quaternary chronologies. Sixteenth Internat. Geol. Cong. Rept., pp. 1–4. Washington.

BAILEY, V. 1936. The mammals and life zones of Oregon. U. S. Dept. Agric., Bur. Biol. Survey, N. Am. Fauna 55. Washington.

CRESSMAN, L. S. 1936. Archaeological survey of the Guano Valley region in southeastern Oregon. Univ. Oregon Monographs, Studies in Anthropology, no. 1.

—— 1937*a*. The Wikiup Damsite No. 1 knives. *Am. Antiquity* **3**: 53–67.

—— 1937*b*. Petroglyphs of Oregon. Univ. Oregon Monographs, Studies in Anthropology, no. 2.

—— 1939. Early man and culture in the northern Great Basin region of south-central Oregon. *Carnegie Inst. Washington Year Book* 38: 314–317.

—— 1940. Studies on early man in south-central Oregon. *Carnegie Inst. Washington Year Book* 39: 300–306.

—— 1941. Early man in the northern Great Basin region of south-central Oregon. *Proc. Sixth Pacific Sci. Cong.* **4**: 169–175.

—— 1942. Archaeological researches in the northern Great Basin. Carnegie Inst. Washington Publ. 538.

CRESSMAN, L. S., AND W. S. LAUGHLIN. 1941. A probable association of man and the mammoth in the Willamette valley, Oregon. *Am. Antiquity* **6**: 339–343.

CRESSMAN, L. S., H. WILLIAMS, AND A. D. KRIEGER. 1940. Early man in Oregon. Univ. Oregon Monographs, Studies in Anthropology, no. 3.

DRIVER, H. E. 1939. Culture element distributions: X, northwest California. *Anthropol. Records* **1** (6): 297–433.

GUERNSEY, S. J., AND A. V. KIDDER. 1921. Basket Maker caves of northeastern Arizona. *Papers Peabody Mus. Am. Archaeol. and Ethnol.* **8** (2).

HARRINGTON, M. R. 1933. Gypsum Cave, Nevada. Southwest Mus. Papers 8.

HEIZER, R. F. 1941. Aboriginal trade between the Southwest and California. *Southwest Mus. Masterkey* **15**: 185–188.

HOWARD, E. B. 1935. Evidence of early man in North America, based on geological and archaeological work in New Mexico. *Univ. Pennsylvania Mus. Jour.* **24** (213): 61–158.

HOWARD, E. B., AND E. ANTEVS. 1935. The occurrence of flints and extinct animals in pluvial deposits near Clovis, New Mexico. *Proc. Acad. Nat. Sci. Philadelphia* **87**: 299–312.

KELLEY, I. T. 1932. Ethnography of the Surprise Valley Paiute. *Univ. California Publ. Am. Archaeol. and Ethnol.* **31**: 67–210.

KIDDER, A. V. 1924. Introduction to Southwestern archaeology. New Haven.

—— 1936. Speculations on New World pre-history. In: Essays in anthropology in honor of Alfred Louis Kroeber, pp. 143–152. Berkeley.

KROEBER, A. L. 1939. Cultural and natural areas of native North America. *Univ. California Publ. Am. Archaeol. and Ethnol.* **38**: 1–242.

LOUD, L. L., AND M. R. HARRINGTON. 1929. Lovelock cave. *Univ. California Publ. Am. Archaeol. and Ethnol.* **25**: 1–183.

MASON, O. T. 1904. Aboriginal American basketry: studies in a textile art without machinery. *U. S. Nat. Mus. Ann. Rept.* 1902: 171–548.

MERRIAM, J. C. 1941. Paleontological, geological, and historical research. *Carnegie Inst. Washington Year Book* 40: 327–329.

MONTANDON, G. 1937. La civilization Ainou et les cultures arctiques. Paris.

MORRIS, E. H., AND R. F. BURGH. 1941. Anasazi basketry. Basket Maker II through Pueblo III: a study based on specimens from the San Juan River country. Carnegie Inst. Washington Publ. 533.

ROBERTS, F. H. H., JR. 1940. Developments in the problem of the North American Paleo-Indian. *Smithsonian Misc. Coll.* 100: 51–116.

RUSSELL, I. C. 1884. A geological reconnaissance in southern Oregon. *U. S. Geol. Survey, Fourth Ann. Rept.*: 431–464.

SAYLES, E. B., AND E. ANTEVS. 1941. The Cochise culture. Medallion Papers 29: 1–81. Globe.

SETZLER, F. M. 1935. A prehistoric cave culture in southeastern Texas. *Am. Anthropologist* 37: 104–110.

SMITH, E. R. 1941. The archaeology of Deadman Cave, Utah. *Univ. Utah Bull.* 32 (4): 1–43.

SMITH, W. D., AND L. C. RAYMOND. 1934. Physiographic diagram of Oregon: V, the Great Basin. New York.

STEWARD, J. H. 1940. Native cultures of the intermontane (Great Basin) area. *Smithsonian Misc. Coll.* 100: 445–502.

WARING, G. A. 1908. Geology and water resources of a portion of south central Oregon. *U. S. Geol. Survey Water Supply Paper* 220.

WEDEL, W. R. 1941. Archeological investigations at Buena Vista Lake, Kern County, California. *Bur. Am. Ethnol. Bull.* 130.

WELTFISH, G. 1930. Prehistoric North American basketry techniques and modern distribution. *Am. Anthropologist, n.s.*, 32: 454–495.

—— 1932. Preliminary classification of prehistoric southwestern basketry. *Smithsonian Misc. Coll.* 87 (7).

WILLIAMS, H. 1941. Crater Lake: the story of its origin, pp. 3–97. Berkeley.

—— 1942. The geology of Crater Lake National Park, Oregon, with a reconnaissance of the Cascade Range southward to Mt. Shasta. Carnegie Inst. Washington Publ. 540

DISCOVERIES IN SANDIA CAVE AND EARLY HORIZONS IN THE SOUTHWEST

FRANK C. HIBBEN

Museum of Anthropology, The University of New Mexico

(*Read April 23, 1942*)

STUDIES of the Paleo-Indian in North America have entered a new stage. The existence of such an individual is now firmly established, as is the general fact of his entrance into the New World and his coexistence with a number of large mammal forms now extinct. Geological and paleontological data have consistently furnished substantiation and a narrowing chronological field of investigation. These studies have now entered a phase of differentiation of cultural horizons and the arranging of these in valid sequences to provide the actual opening chapters in New World prehistory.

Most of such evidence has revolved around connections and correlations with the Folsom and associated problems, but because of difficulties with the present available chronological methods, time relationships of the Folsom and other so-called "Early" cultures have remained extremely vague. A cave site in the Sandia Mountains near Albuquerque, New Mexico, has been found to contain evidence which aids in this chronological problem. After three years of excavation in this cave under the auspices of the University of New Mexico, evidence has been found of a stratigraphic nature which involves the Pleistocene controversy, as well as the Folsom horizon.

This cave, known as the Sandia Cave, lies on the eastern side of Las Huertas Canyon in the northern end of the Sandia Mountains, some ten miles east of the town of Bernalillo, New Mexico. The Sandia Cave is one of several cavities in the Pennsylvanian limestone of that immediate area (figs. 1, 2). It is not an imposing cavern, but may be described as tunnel-like. The cave dips with the limestone strata towards the east, and is long and narrow, with an average diameter of 3 meters and a length of 139 meters (figs. 3, 4). Its mouth opens upon a small precipice at the present time, with evidences of comparatively re-

FIG. 1. Las Huertas Canyon, New Mexico, looking north. The Sandia group of caves shows in the cliff on the right.

FIG. 2. Sandia Cave as it appears from across Las Huertas Canyon. Safety scaffolding shows in the cave mouth.

FIG. 3. Sandia Cave interior.

FIG. 4. Sandia Cave interior.

cent erosion. A ledge, which once gave access to the cave mouth, has fallen away and possibly a considerable portion of the cave itself has disintegrated in like manner. The cave at the present time is absolutely dry, but with abundant evidences of former moisture. When first discovered, only a small antechamber was open from the front, and throughout its length the passages were clogged with debris and fallen rock in several places. There is evidence that several times during the history of the cave the entrance was completely blocked.

Completion of the excavation of the Sandia Cave as well as of other cave sites in the vicinity has been made possible by a grant from the American Philosophical Society. Recent work

has served to corroborate that of former seasons, especially in regard to some clearly defined stratigraphy in the cave floor, representing at least two separate and distinct occupations. The stratigraphy of the various deposits and the culture represented now seem entirely clear.

The upper stratum of deposits in the cave is composed almost entirely of pack rat and bat accumulation with no cultural material excepting in the extreme front. This cultural material is recent, that is, Pueblo, and this entire upper layer may be regarded as comparatively modern, although the accumulation reaches in some places a depth of two meters. This upper stratum extends entirely to the roof of the cavern in many sections, rendering only the entrance portion for a short distance accessible in late Pueblo times. It is evident that the cave was blocked during the period of Pueblo occupation. This upper layer is now absolutely dry, and was deposited entirely in the absence of moisture.

Beneath this recent accumulation lies a considerable layer of calcium carbonate, stalagmitic material laid down during a moist period. This crust varies in thickness and also in texture. Generally it is some six centimeters thick and has a crystalline appearance. It is connected on the walls with sheet calcium carbonate flow formations and with occasional stalactites and stalagmites. This capping is unbroken throughout the cave and acts as a seal for the material beneath. It also appears in tests in surrounding caves.

The uppermost Pleistocene cultural layer lies directly beneath this calcium carbonate crust This layer is a breccia partially consolidated by infiltrating water carrying calcium carbonate in solution evidently during the same period as the superimposed stalagmitic crust just mentioned (fig. 5). The cultural layer is composed of fragments of limestone, pieces of yellow ochre, charred material, bones, and implements, cemented closely together with less consolidation toward the lower portion of the stratum. The material represents debris of a cave floor consolidated by calcium-bearing waters percolating from above. The implements contained are classic Folsom in nature (figs. 6, 7). Folsom points in place occur in moderate numbers and are of classic shapes and measurements. Gravers, side-scrapers, end-scrapers, and one fragment of shaped bone also occurred in this stratum (fig. 8). The Folsom stratum varies in thickness and somewhat in composition from end to end of the cave. Cultural matter is necessarily more scant farther from the entrance. Bone material, notably sloth, increases in proportion toward the rear of the cave. This layer is generally less than a meter in thickness, although accumulations are evident in some sections where the pitch of the cave is less precipitous.

Associated with the Folsom points is a type of projectile point of somewhat different nature but

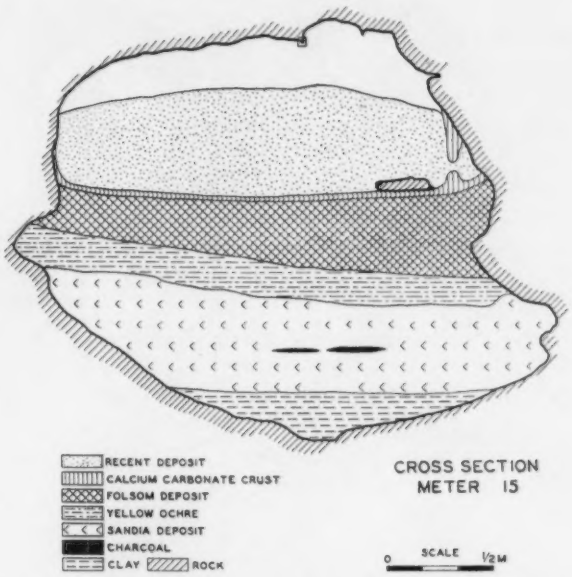


FIG. 5. Cross-section of Sandia Cave at meter 15.

FIG. 6. Folsom point embedded in the breccia of the Folsom debris.

FIG. 7. Folsom point from the Folsom level of Sandia Cave.

apparently similar age (fig. 9). This has classic Folsom outline and fine chipping but lacks the channel grooving on either side.

Beneath the Folsom level occurs a consolidated layer of yellow ochre. This is finely laminated, evidently water-laid, and absolutely sterile. Its origin is local, since the limestone contains considerable quantities of iron in concretion form.

Below the yellow ochre occurs another cultural layer. This is the so-called Sandia layer, the earliest represented in the cave (fig. 5). The Sandia stratum is of loosely consolidated breccia, softer than the Folsom matter and in many places of considerably greater thickness. This layer is marked by larger fragments of limestone, some of them of several tons' weight—evidently roof fragments. Occasional pieces of yellow ochre consolidated into a friable stone also occur. The material has been compressed by dampness but is not water-laid. A definite cave floor lies at the base of the Sandia stratum and the material contained in the layer is cave debris, both cultural and from the lairing of animals. This cultural layer is less disturbed than the Folsom deposits above. Two fire hearths have been found in place, and charcoal evidence is relatively abundant. Mammal remains are represented for the most part by tooth fragments, and preservation is poor. Slight dampness is in evidence in the lower portion. Projectile points contained in this layer are entirely different from those of the Folsom above. These so-called Sandia points are comparatively crudely chipped. Material is coarser, and some of it is local from the nodular chert in the limestone surrounding the cave. In shape, these points are side-notched with a side shoulder after the manner of the late Solutrean of Europe, although no connection is implied. These side-

FIG. 9. Folsom-like point in debris of Folsom layer.

FIG. 8. Folsom blade embedded in breccia.

shouldered points present two subtypes. One of these is of more rounded outline, and the point itself is lenticular in cross-section. The other variety has a straighter stem and parallel sides with a somewhat diamond-shaped cross-section (fig. 10). Both are, however, side-notched in the same general fashion. Other material culture in the Sandia layer consists of snub-nosed scrapers, side-scrapers, and various flakes, some of which show use.

Below the Sandia Cave floor is a compact sterile stratum of disintegrated limestone. This conceals an old water channel in the bedrock.

This stratigraphy, with implications of successive wet and dry periods, naturally suggests a possible correlation with glacial oscillations and pluvial stages as accomplished in the case of certain other sites, notably Clovis and Lindenmeier. Professor Kirk Bryan has very kindly examined the deposits in the Sandia Cave and has arrived at certain tentative conclusions, for which I am indebted. Although the cave deposits have no physical connection with any terrace or alluvial deposits, their sequence, in itself, may indicate some correlation. Professor Bryan especially pointed out that the artifacts contained in these various layers may, in themselves, be the means for identifying these successive periods with other periods and stages as outlined on other sites, thus strengthening the heretofore vague sequence of Late Pleistocene and Early Recent events. The assemblage of beds in the cave implies a certain sequence of events, entailing at least two moist periods after the original one in which the cave was formed. By correlation

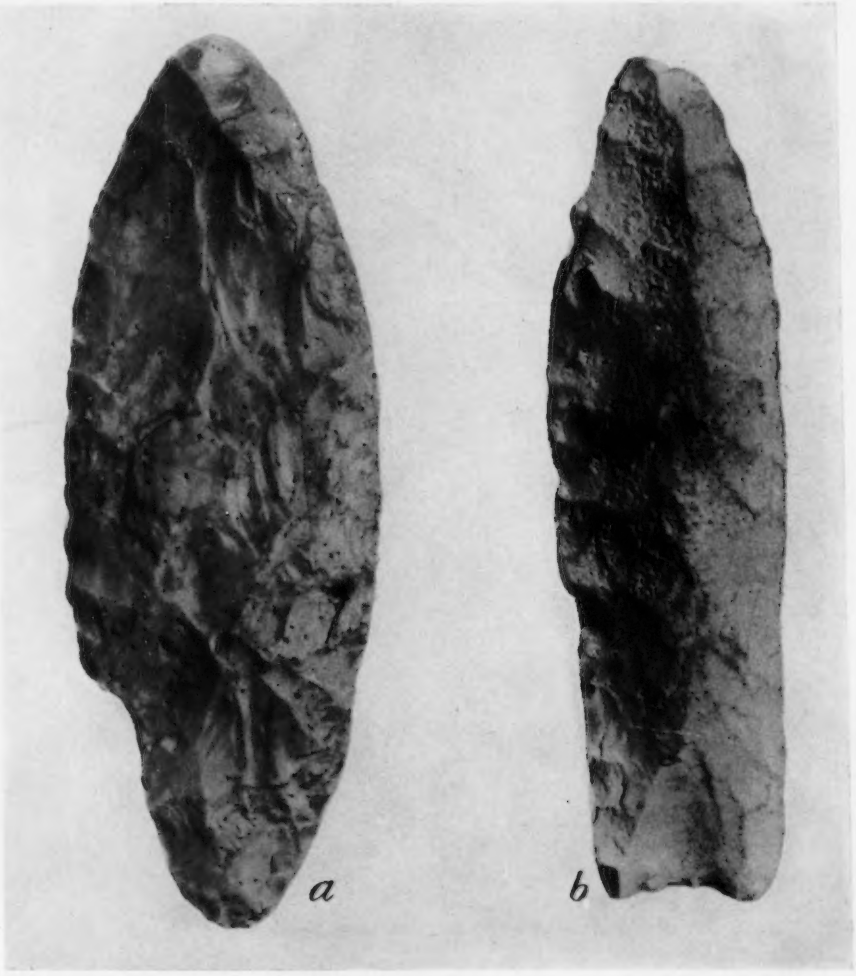


FIG. 10. (*a*) Sandia point of Type I. (*b*) Sandia point of Type II. (Both slightly enlarged.)

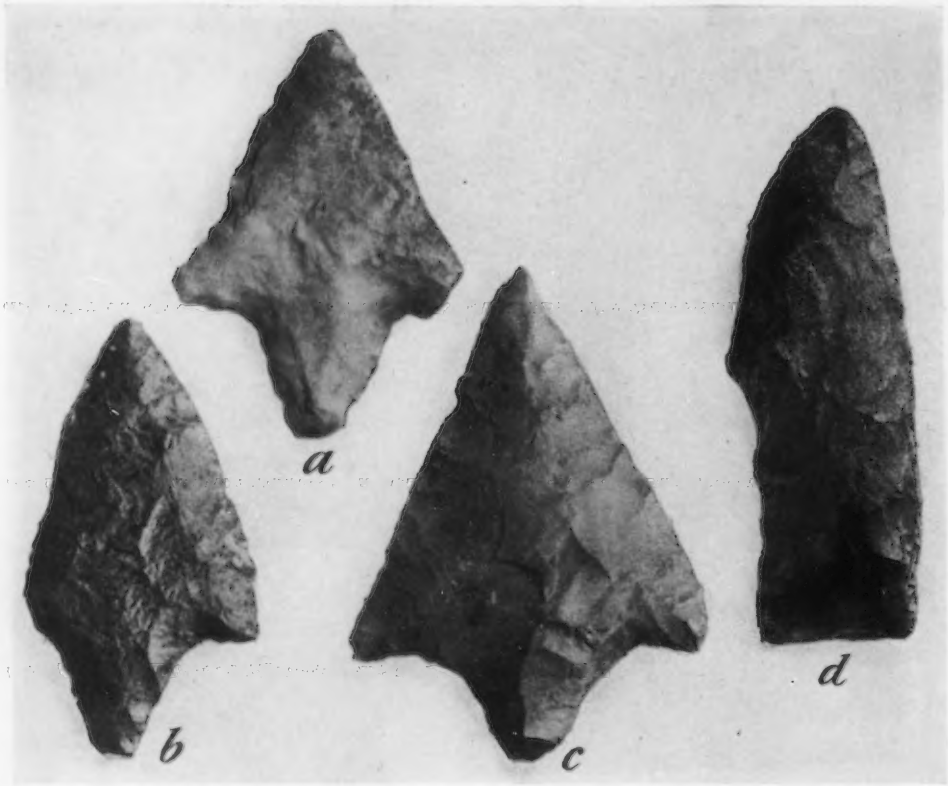


FIG. 11. (*a*, *b*, *c*) Points from Manzano Cave similar to those from Gypsum Cave, Nevada. (*d*) Sandia point from the lower level of Manzano Cave. (All actual size.)

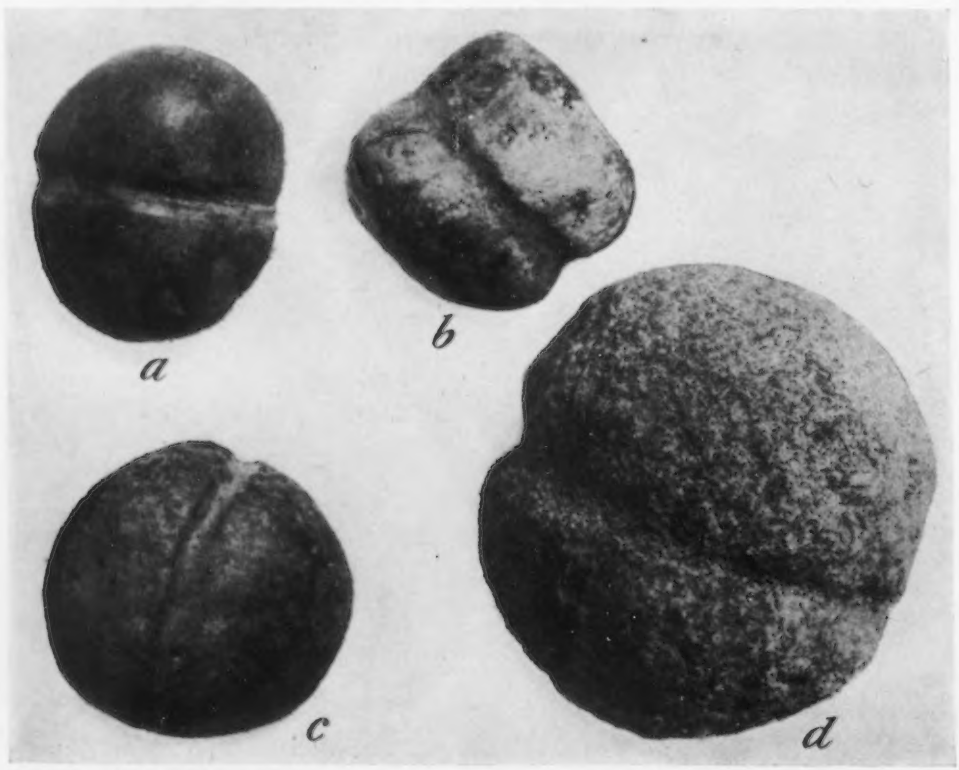


FIG. 12. (*a*, *b*, *c*) Set of three bola weights from Manzano Cave. (*d*) Bola weight of granite from Manzano Cave. (All actual size.)

with the sequence at the Lindenmeier site in Colorado, the upper one of these layers, or the classic Folsom layer, may be identified as following closely that glacial stage known as Corral Creek. Presumably, then, the lower Sandia stratum of the cave and its contained pre-Folsom culture occupy a chronological position just previous to the climax of the humid period which is represented by the yellow ochre. This would imply a considerable, but as yet unascertainable, period of time.

The stratification of a culture below a layer containing Folsom material has already been implied by many scattered, but unfortunately unstratified, sites. A precursor to the highly developed techniques of the Folsom has been suspected and expected for some time.

Faunal remains substantiate this sequence. All forms below the calcium carbonate crust are extinct. The Sandia stratum contains horse, bison, camel, mastodon, and mammoth. The Folsom level is distinguished by horse (fig. 13), camel, bison, mammoth, ground sloth, wolf. It is to be noticed that the mastodon is absent in the Folsom assemblage but this may be fortuitous. All forms above the travertine layer are modern with the exception of the sloth, which occurs low down in the recent accumulation and near the rear of the cave. This is another commentary on the late survival of this one form.

In another cave site in this same area, the Manzano Cave near the small town of the same name in the Sandia area, additional evidences and stratigraphy occur which overlap with those of Sandia Cave. Although this latter site had been disturbed, a sequence was established which involved a cemented layer evidently corresponding to the calcium carbonate crust of the Sandia site and cultural layers both above and below this hardened stratum. Below this crust in the Manzano Cave was recovered one Sandia point with the typical side shoulder (fig. 11*d*). Above the cemented layer there was a considerable accumulation, apparently Recent, but mixed with bones of sloth and camel and some artifacts. These latter consist of three projectile points and a number of whole and fragmentary grooved stone balls. The projectile points (fig. 11), although differing slightly, may, because of the shape and the associated sloth and camel, be identified with those from Gypsum Cave, Nevada. The stone balls appear to be bola weights, especially since one set of three was found together (fig. 12). Bola weights of this variety are now represented by numerous specimens from various sites in the Albuquerque vicinity.

From the Sandia Cave strata, coupled with those from the Manzano site, we may deduce the following sequence of events beginning with the most recent:

Manzano – Gypsum Cave level with distinctive points and bola weights accompanied by

FIG. 13. Horse skull (*Equus excelsus*) from the deposits at Placitas near Sandia Cave.

sloth and camel remains—Early Recent in date.

This period was preceded by a wet period which marks the end of the Pleistocene.

Folsom of Sandia Cave contemporaneous with Folsom of Lindenmeier or Clovis, with bison, horse, camel, mammoth associated. Early Recent or Late Pleistocene.

Preceded by a wet period represented by the yellow ochre.

Sandia stratum or pre-Folsom level with typical Pleistocene fauna including the mastodon.

This, then, is the nucleus of a sequence indicating the chronological relationships of the variations of the Paleo-Indian. Notable lacuna is the non-definition of the position of the Yuma horizon.

FOLSOM AND YUMA PROBLEMS

EDGAR B. HOWARD

University Museum, University of Pennsylvania

(*Read April 23, 1942*)

THE discovery some fifteen years ago, near Folsom, N. M., of a number of specialized spear points in definite association with remains of extinct bison, posed a new set of problems in connection with the study of Early Man in the New World. Some of these problems are on the way towards solution; others, however, such as that of chronology, are still with us.

In attempting to answer questions as to when man first came to this continent, where he came from, and how he got here, a good many assumptions have to be made, although evidence is accumulating that encourages the belief that, in time, a reasonably accurate prehistoric American chronology will be established.

Let us, then, have a look at what some of the various fields of investigation have to offer by way of answering the question as to when man arrived in the New World. The range in estimating this relative time covers a long period, extending from a minimum of 2,000 B. C.[1] to 70,000 years or more ago. The extreme age given by a geologist is 70,000 years.[2] With this exception, American geologists have kept within a range of 10,000 to 25,000 years. Archaeologists are not satisfied with such wide ranges, and are continually pestering geologists for a more accurate time-scale. These latter, playing safe by generous use of plus and minus signs, ask why archaeologists do not establish their own chronology. To this there appears to be no answer.

When it comes to the paleontologists, we find they are inclined to swing towards a more recent dating. The association of Folsom points with the remains of extinct animals no longer seems to impress the paleontologist that any great age is indicated, since he is convinced that these extinct animals did not, in all cases, die out at the end of the Pleistocene, but lived on into comparatively recent times. The fresh condition of the remains of some specimens of extinct animals from caves seems to justify this opinion, in part; but familiarity with the dry caves of the Southwest reveals that even more fragile material than bone is well preserved for a long period of time under these conditions, and therefore the evidence may be misleading in judging age. Discoveries such as that announced by Uhle[3] some years ago from Ecuador, where mastodon bones were found associated with several obsidian points and pottery sherds datable to the beginning of the Christian Era, have also added weight to more conservative paleontological opinion. In North America, on the other hand, mammoth bones have been discovered in a number of places, associated with man-made objects but not with pottery.[4] Attention should also be directed towards a recent discovery in Missouri, referring to the possibility of the association of mastodon bones with pottery.[5] It may be pointed out here that these extinct animals do not seem to have existed up to very recent times, in the Southwest at least. Their remains have not been found in caves at "Basket Maker" levels. In Burnet cave,[6] for example, where bones of a great number of species of extinct animals turned up, all were found below the cave dweller remains.

A long gap exists between the time of the Basket Maker, whose appearance is now placed at about the beginning of the Christian Era, and the time of Folsom man, the most conservative estimates of whose existence would be around 10,000 years ago. Little is known archaeologically of this period of some 8,000 years, with the exception of the two lower levels of Signal Butte, and possibly Gypsum cave, and a few other places which fall within it. About all that can be said with any assurance is that the mammoth and other animals, often associated with it, died out in the

[1] H. J. Spinden. *Brooklyn Mus. Quarterly* **22** (3): 129, 1935.

[2] M. M. Leighton. *Medallion Papers* 24. Globe, 1936.

[3] Max Uhle. *Proc. Twenty-third Internat. Cong. Americanists*, p. 247, 1928.

[4] E. H. Sellards. *Bull. Geol. Soc. America* **51**: 373 et seq., 1940.

[5] R. McC. Adams. *Trans. Acad. Sci. St. Louis* **30** (5): 184 (footnote), 1941.

[6] E. B. Howard. *Univ. Mus. Jour.* [Philadelphia] **24** (23), 1935.

Southwest somewhere between Folsom time and the appearance of the Basket Maker. In Siberia[7] it appears that the mammoth was either postglacial or interglacial. In one locality along the Yenisei River, at over 70° N. latitude, for example, deposits in which the mammoth was found also contained twigs and leaves of the birch and willow and roots and wood of the tamarack. In the New Siberian Islands bones of the mammoth have been found to be most frequently associated with birch, willow, and alder, indicating an interglacial profile. Today these trees are found 5 to 6 degrees farther south, indicating an ancient climate of the New Siberian Islands comparable to that of the present interior of eastern Siberia. The famous Berezovka mammoth from northeastern Siberia had in its mouth and stomach plants of a meadow flora, such as characterizes the region at present and which can scarcely be called glacial. The mammoth, according to Osmolovsky and Gromov,[8] disappeared from almost the entire area of the U. S. S. R. at the very end of the Paleolithic stage, not being found at Azilian sites. Thus it would appear that much more can be done along these lines than has been done to increase knowledge of postglacial times in our own country.

The great difficulty in this whole problem of Early Man is to get at the facts. The facts are few, and their interpretation allows so much leeway for speculation that it is sometimes hard to separate one from the other. Theories, however, are valuable, even though they come fast and furious in so far as they relate to man's migrations to the New World from Asia.

European scientists have contributed many interesting ideas. Albrecht Penck,[9] who visited the site near Folsom, N. M., in 1928, is one. He questions the possibility of man having become so widely dispersed in the New World and having had to adapt himself to so many different climatic zones in such a short time as 25,000 years. He points out that from Alaska to Tierra del Fuego six to eight climatic zones occur, ranging first from Arctic forest to steppes, then deserts, tropical rain forests, tropical highlands, then to steppes again, and finally to a cool wet region. Dwellers of the Bering Strait region encountered these varying environments on their long trek to the tip of South America. Penck found it difficult to account for peoples, already adapted to an Arctic environment by their northward migration in Asia, directing themselves counter to this, after crossing the region of Bering Strait and heading south. For this reason he postulates man as having spread to North America at the end of an interglacial stage, and then, as the ice sheets formed, migrating south with the environment to which he had already become adapted.

Another interesting European theory is that put forth by von Eickstedt,[10] who sees in the formation of the ice sheets in Siberia during the last glaciation such formidable barriers, that people living within the region thus encircled, were cut off from the rest of the world and locked up there till gateways were opened up, as the ice retreated slowly to the mountains. One such gateway, on the upper Lena River, near Lake Baikal, he believes, opened up great habitable areas and allowed migration through the Baikal Basin, which as a route was more extensively followed during the warm *Littorina* period. The people locked up in Siberia, von Eickstedt believes, were of several types: some he calls East Europids, predominantly blonde and moderately brachycephalic; others were allied to Cro-Magnon man; and finally there was a Nordic type. We have no doubt that the ice in Siberia during the last glacial stage covered large areas, but the evidence as supplied by geologists is not always in agreement.

According to several authorities, terminal moraines on the east side of the Ural Mountains reached down to about 62° N. latitude, and extended in a general northeasterly direction to the Taimyr Peninsula. The Anadyr, Kolyma, Verkhoyansk, and other mountains form a large bow stretching from the basin of the Lena River to the Okhotsk Sea, and then continuing to bend around to East Cape on Bering Strait. These mountains were all glaciated, as were also the mountains between them and Lake Baikal. At the glacial maximum these mountains would have raised a formidable barrier to migration. It might have been possible to have cut across the mountain passes to the north of the range, but according to some authors the region bounded by the bow of mountains above mentioned was also covered with ice. On the other hand, it seems to be generally agreed that the ice during the Pleistocene in Siberia was not as extensive as in North Amer-

[7] E. Antevs. *Am. Geog. Soc. Research Ser.* no. 7, 1928.

[8] Osmolovsky and Gromov. *Sixteenth Internat. Geol. Cong. Rept.* 2: 1291, 1936. Washington.

[9] A. Penck. *Proc. Internat. Cong. Americanists*, p. 23, 1928.

[10] E. F. von Eickstedt. *Rassenkunde und Rassengeschichte der Menschheit.* Stuttgart, 1934.

ica; in fact, according to Antevs,[11] it was small in comparison with the ice sheets in North America and in Europe. In other words, there was no great ice sheet, but in Siberia east of the Lena River all the high mountain ranges were glaciated and local glaciers extended to Bering Sea.

An important paper of recent years by Osmolovsky and Gromov, already referred to, gives some data upon early Siberian cultures, with geological and paleontological backgrounds. In this it is stated that the only glaciation of the Quaternary in the U. S. S. R. was the one in which the terminal moraines of the Riss glaciation were deposited, and that Paleolithic man first occupied the country to the south of the maximum glaciation, gradually pushing northward as the ice retreated. It is the opinion of these authors that man had reached the final stages of the Paleolithic culture at a time when the continental sheets of ice had not yet completely disappeared.

From these opinions we gain the impression that at the maximum of the ice advance in Siberia there were serious obstacles to migration, but that the ice was not as extensive as in North America and that corridors leading to Bering Strait opened shortly after recession set in. There must also have been areas in northeastern Siberia corresponding to the unglaciated region of Alaska which would have favored migration.

Dr. Spinden[12] also furnishes us with some food for thought. The "American complex," which he places in a region somewhat southwest of Lake Baikal, was not ready, he believes, before 2500 B. C. to 2000 B. C. This leads him to ask whether it does not seem a bit queer that man should arrive as an immigrant some 10,000 to 15,000 years before he could leave as an emigrant. He assumes that the earliest culture in the New World corresponded to the Neolithic as defined in the Old World, and that the Paleolithic reached only as far north as a line drawn from about latitude 40° N., just at the northern boundary of Korea, to the northwest, crossing the Volga River at about latitude 55° N. He states that the evidence is clear that man worked his way north from somewhere in Central Asia, but that it does not appear he lived far enough north, during the Paleolithic, to have spilled over into America. First of all, it is true that such Paleolithic sites as had turned up in Siberia when Spinden published his paper, were a relatively long way from East Cape on Bering Strait. But it is also true that those who had worked in that region were not sure where the line should be drawn between Upper Paleolithic, as known in Europe, and the Neolithic.

Henry Field and Eugene Protov state, in a manuscript[13] from which I have permission to quote, that Upper Paleolithic sites are recognized in the Altai Mountains, in the upper Yenisei Valley, in the Angara Valley, and in Trans-Baikalia. Human skulls from the Altai region, these authors state, show closest analogy to the skulls of the Cro-Magnon of western Europe. They do not consider the Siberian Neolithic period at all uniform, and not particularly recent. Five successive culture stages of the Baikal area are discerned, ranging from 6000 B. C. to about 1000 B. C.

One thing is obvious in this outline of Siberian cultures: no solution of the problem of dating the earliest migration to America is quite so simple as that offered by Spinden. In the first place, the tremendous area stretching from Lake Baikal to Bering Strait is practically a blank archaeologically. Does a line, then, drawn across Siberia, connecting a handful of Paleolithic sites, give us very convincing proof that man could not have reached beyond this at a relatively early time? Furthermore, why should it be assumed that the Paleolithic in Siberia was similar to that of western Europe in its cultural composition, and particularly as to the time factor involved? Recent archaeological work seems to show that it was not the same; therefore, basing the element of time on European concepts, without modification to fit the Siberian picture, is only confusing the issue. We cannot solve our archaeological and geological problems in America by trying to fit them into a European framework. This is not to say, however, that a thorough understanding of the European picture is not essential.

Thus we see that whether we try to correlate our early American stone industries with a given period, as understood in Europe, or whether we try to evolve our own classifications independently, it is a complicated affair.

Why no skeletal remains of "Folsom Man" have been found, in spite of more than a decade of intensive search, may appear to be a reflection upon the abilities of the American archaeologist. With-

[11] E. Antevs. *Am. Geog. Soc. Research Series* no. 7, 1928.

[12] H. J. Spinden. *Brooklyn Mus. Quarterly* **22** (3): 129, 1935.

[13] Subsequently published in *Am. Anthropologist*, n.s. **44** (3): 388–406, 1942.

out trying to offer any excuses for this deplorable situation, we can only say that Folsom man was unquestionably a hunter, and hence a nomad, and it is reasonable to assume that in customs relating to disposal of the dead, he would follow closely the practice of other hunting tribes of the Plains. He could have left the bodies of his dead upon scaffolds, in lodges, in trees, or in boxes as many of the Plains Indians did, or he could have cremated the bodies, but whatever he did in this connection, he seems not to have left us any evidence that he existed other than that he attained the highest art in stone-chipping in the New World. Under such circumstances it would be the merest chance to come across a skeleton of Folsom Man anywhere in the enormous area of our Great Plains country. It would be even more remarkable to recognize him as such, unless he had a Folsom point in his hand, or was holding an elephant by the tail. Some day his remains may turn up in a cave, where he may have retired for shelter during the winter, or one of the members of a hunting party may have been killed at the site of some ancient waterhole, but so far he is the number one mystery man of our time.

We find some difference of opinion among anthropologists regarding the time when man first arrived in the New World. On the whole, however, they are on the conservative side, and with some urging might concede as much as 10,000 years as an estimate along this line. There would seem to be general agreement that these earlier types of people would be narrow-headed and that they would represent a mixture of several racial elements. Some[14] would hold that this blend would be composed of Negroid, Mediterranean, and Archaic White elements, later mixed with Mongoloid strains, while others would contend that the Mongoloid affinities were basic. Whether these differences were acquired before man migrated from Asia or largely after he arrived in America, seems also to be an undecided question among those whose researches have been along this line.

There is, however, no disagreement about the fact that, so far, in the New World no human skeletal material has been unearthed which can compare to the primitive forms of Neanderthal man found in Europe, Asia, and Africa. It is suggested, of course, that the possibility of such a discovery in the future cannot be eliminated. It took a long time to find Neanderthal man in Europe, in an area much smaller than that encompassed by the shores of the Americas, and in time it may be that a comparably early human type will turn up here. When, and if, that happens, we shall have to revise our whole concept of Early Man on this continent; but the fact remains that in spite of intensive search only recent types have been discovered up to the present. There was some excitement with regard to the Punin skull from Ecuador.[15] The discoverers of this specimen, backed up by the opinion of Sir Arthur Keith, believe it shows distinct Australoid characteristics. Nobody, however, suggests that it is as primitive as the skull of Neanderthal man, or that it could be assigned to any other than *Homo sapiens*.

We have spent a disproportionate amount of time, perhaps, upon the problem of when man first came to this country. It is, of course, the most interesting phase of the whole problem and the one we should all like to see solved satisfactorily. Most generally, opinion seems to oscillate between a minimum of 10,000 and a maximum of 25,000 years. There are other questions, however, to which the answers are elusive, and yet they are also important in any attempt to build up our knowledge of American prehistory. For example, the Folsom point no longer seems to hold its place as being the earliest type of stone point in North America. There are other types which occur in one or two places stratigraphically lower. What is the connection, if any? What is the relationship of the typical Folsom to other types of fluted points and to the Yuma point? Is the specialization of the Folsom purely an American invention? Thanks to a grant from the American Philosophical Society which enabled me to study collections in Russia, I could find no similar type from Siberia, where they should most likely have turned up. In view of the small amount of work done in eastern Siberia, however, it may be too early to draw conclusions. There are certainly types from Manchuria which could pass as Yuma points. An assemblage of artifacts from the earlier sites around Lake Baikal gives one the impression that there is some connection with our earlier types here, though I have yet to see a Fluted point outside of North America, except the bone points of Manchuria, made so that the natural hollow of the bone forms a fluted

[14] E. A. Hooton. *The American aborigines*, p. 161. Toronto, 1933.

[15] Sullivan and Hellman. *Anthropol. Papers Am. Mus. Nat. Hist.* **23**: 313, 1925.

face on one side. What connection, if any, is there between some ancestral Eskimo forms and certain Yuma types of point, or the bevelled bone foreshafts found with the mammoth at Clovis, and similar foreshafts from other early sites here, and those found in Alaska and in Siberia? Are certain types of Yuma artifacts knives of the Folsom complex, or is one an earlier type than the other?

There are innumerable questions of typology requiring answers which we cannot go into in this brief outline. There are as well endless problems having to do with the reconstruction of the environment of Folsom Man: studies of pollen and diatoms, invertebrates, and plant migrations. There is so much field work necessary to establish the boundaries of ice advance of the last glacial stage, especially in relation to the mountain glaciation of the Rockies; of changes in sea-level, affecting land connections at Bering Strait; of correlation of various terraces with glacial moraines; of soil profiles; yes, and even studies of corn development which botanists are now carrying on. The results of all these studies, as they are carried on usually quite independently of each other, will be ready to be correlated some day. When that time arrives, we can expect to have a satisfactory answer to most of the questions raised by the discoveries of Folsom and Yuma sites.

A POSSIBLE COCHISE-MOGOLLON-HOHOKAM SEQUENCE

EMIL W. HAURY

University of Arizona

(Read by Frank C. Hibben, April 23, 1942)

Geologists and archaeologists have firmly established the existence in North America of hunting and food-gathering people during recent geological times.[1] Precise dating of these is admittedly not possible, but estimates, based on a careful evaluation of all available geological and climatological evidence, assign such cultures to time levels ranging from 10,000 to 25,000 or more years ago. Folsom, Sandia, Clear Fork, Gypsum Cave, Lake Mohave, and Cochise are a few of the cultural manifestations. While the work has been going on in the camp sites of these groups, refined dating methods, particularly the development of the tree-ring technique, have caused the chronologies of the "higher" or agricultural people, as for example the Basket-Maker - Pueblo, to be revised upward and shortened over previous estimates. An ever-widening gulf between the Paleo-Indian and the Neo-Indian has resulted, and the archaeologist has been urged to explain what took place in the interim to give American prehistory the desirable quality of continuity.

A possibility of bridging this gulf is found in the archaeology of southern Arizona where the evidence of the Cochise Culture is abundant. This culture, as reported by Sayles and Antevs,[2] has three recognizable stages which, by a similarity of economy and material remains, are presumed to represent sequent steps in the development of essentially one group of people.

The oldest of these, the Sulphur Springs Stage, is dated at more than 10,000 years ago. The climate then was wetter and cooler than during later times. Bones of animals now extinct, such as the mammoth, camel, dire wolf, and early forms of the bison and horse, are found in the same deposits and directly associated with the implements which characterize the stage. These implements, primarily grinding tools, suggest that the people of this time were food-gatherers and that hunting was apparently of less importance.

The second horizon, the Chiricahua Stage, has been assigned to a period since 8000 and before 3000 B. C. Diagnostic tools have been found in a few instances directly superimposed over those of the Sulphur Springs Stage in geological contexts suggesting more arid climatic conditions. All animal bones recovered were those of species prevailing today. Grinding tools predominated, and the chipped implements were primarily percussion-flaked. The entire stone industry, except a few pressure-flaked projectile points, was derived from the preceding stage.

Although the dates for the San Pedro Stage are admittedly an estimate, its position as the most recent in the unbroken sequence makes it the logical place to look for potential connecting links between the pre-agricultural and the agricultural groups. Sayles implies the possibility of this when he states, "The Chiricahua and San Pedro Stages . . . provide evidence of this intermediate period in southeastern Arizona."[3] The ending date of 500 B. C. for the San Pedro Stage carries the Cochise Culture chronology very near to the estimated time of the introduction of pottery in southern Arizona.

Pottery is an attribute of the two principal "higher" groups of the area, the Mogollon and the Hohokam Cultures. Arguments for a considerable antiquity of pottery among these have already been given elsewhere.[4] Generalizing, we may place the introduction of this trait at approximately the time of Christ, allowing for a leeway of a century or two either way. Evidence also suggests that agriculture arrived at approximately the same time.

---

[1] Admirably summarized by Roberts, F. H. H., Jr., Developments in the problem of the North American Paleo-Indian. *Smith. Misc. Coll.* **100**: 51–116, 1940.

[2] Sayles, E. B., and E. Antevs. The Cochise Culture. *Medallion Papers* 29. Globe, 1941.

[3] *Ibid.*, p. 29. See also Gladwin, H. S., E. W. Haury, E. B. Sayles, and N. Gladwin. Excavations at Snaketown **1**: 118. *Medallion Papers* 25. Globe, 1937.

[4] Gladwin, H. S., E. W. Haury, E. B. Sayles, and N. Gladwin. *Op. cit.*, pp. 212–229.

Haury, E. W. Excavations in the Forestdale Valley, east-central Arizona, pp. 91–96. *Univ. Arizona Social Sci. Bull.* 12, **11** (4).

There are as yet no decisive indications to show which of these two cultures received pottery and agriculture first. Inspection of the oldest pottery of both peoples suggests that in certain specific characters, namely the oxidized firing technique, kinds of wares, and in the color and nature of the design of the oldest painted types, there are striking resemblances. These similarities, together with the apparently simultaneous or near-simultaneous appearance, would indicate a common parentage.

This bare statement of the situation, which focuses attention on the small interval of time separating the non-pottery and the pottery cultures, now brings us face to face with the critical part of the problem: Does the appearance of pottery represent the arrival of a new group in the area inhabited by the recently vanished Cochise Culture? Or, does it mean that pottery arrived by diffusion and was adopted by surviving members of the Cochise Culture, who, with agriculture and possibly some fresh blood, took a new lease on life and developed in the western and the eastern parts of the region in divergent lines to become the Hohokam and the Mogollon manifestations? The answer to this is still largely speculation, but there are a few bits of evidence which point to the latter alternative.

The possible link between the San Pedro Stage and the Mogollon Culture of southeastern Arizona and southwestern New Mexico is now being investigated by Gila Pueblo, so that only passing reference may be made to this half of the problem. Published reports[5] and personal experience indicate strongly, however, that early Mogollon sites produce a stone implement typology which reflects inheritance from the San Pedro horizon. Stated in another way, the addition of pottery, agriculture, and a few other traits to the lithic industry of the San Pedro Stage, seems to have ushered in the earliest Mogollon horizon.[6]

More important even than this is the evidence recently accumulated during the excavation by the Arizona State Museum of Ventana Cave on the Papago Indian Reservation. This cave, more properly identified as a large rock shelter, is over 50 meters long and has a habitable shelf from 5 to 8 meters wide. The implement-bearing deposit reached a maximum depth of 5 meters, representing several well-defined culture types. Beginning at the bottom and working towards the surface, there was first a compact layer of eroded volcanic material, cemented with lime and having a maximum thickness of 0.75 meters. This was laid down in a wet cycle and contained the bones of some modern and extinct animals, the latter including the giant ground sloth, tapir, bison, and horse. Associated directly with these remains and locked in the matrix were flaked implements not certainly identifiable with any of the established Paleo-Indian groups but possibly related to the Folsom Culture.

The next and second layer upwards, an average of 2.5 meters in depth, very loose in character and largely the result of man's occupation, contained modern fauna and a wealth of grinding and flaked tools. The grinding stones have much in common with the Chiricahua Stage tools of the Cochise Culture, and the flaked implements, while including all the types found in the Chiricahua Stage, are relatively far more numerous and also include practically all types established for the early cultures of the Pinto and Mohave Basins of California.[7] Towards the upper part of this layer the San Pedro type of projectile point, of long triangular form with broad lateral notches, was abundant. Pottery was not present in this layer except locally in the uppermost zone. During past times, this entire layer was moist enough to cause the decomposition of all organic matter and the formation of potassium nitrate in considerable strength.

Finally, the third and top layer, ranging from 1 to 2 meters in depth, has been dry since its formation and it produced consequently a full complement of material remains. Pottery occurred throughout from bottom to top, and while this layer in itself was not clearly stratified be-

[5] Haury, E. W. The Mogollon Culture of southwestern New Mexico. *Medallion Papers* 19. Globe, 1936.

Martin, P. S., J. Rinaldo, and M. Kelly. The SU site: excavations at a Mogollon village, western New Mexico, 1939. *Field Mus. Nat. Hist. Publ., Anthropol. Ser.* **32** (1), 1940.

Martin, P. S. Recent Mogollon discoveries. *Sci. Monthly* **44** (4): 385–389, 1942.

[6] Haury, E. W. Excavations in the Forestdale Valley, east-central Arizona, p. 130. *Univ. Arizona Social Sci. Bull.* 12, **11** (4).

[7] Campbell, E. W. C. and W. H. The Pinto Basin site. *Southwest Mus. Papers* 9, 1935.

Campbell, E. W. C. and W. H., E. Antevs, C. A. Amsden, J. A. Barbieri, and F. D. Bode. The archaeology of Pleistocene Lake Mohave. *Southwest Mus. Papers* 11, 1937.

Rogers, M. J. Early lithic industries of the lower basin of the Colorado River and adjacent desert areas. *San Diego Mus. Papers* 3, 1939.

cause of disturbances, generally speaking the oldest pottery was deep and the latest was situated high in the fill. Pottery types were mostly assignable to the Hohokam Culture, the oldest being those described for the Vahki and subsequent phases at Snaketown.[8] Papaguerian pottery, probably dating after A. D. 1000, and types specifically of Papago origin of the past century or two were also present. Grinding tools of the Cochise Culture persisted, but there was added a new type of mano, namely, a shaped rectangular stone, usually associated directly with agriculture. This type of milling stone and pottery appeared at approximately the same vertical level in the trash accumulation, bearing out the statement previously made as to the likelihood of the simultaneous appearance of pottery and agriculture.

We are directly confronted in the Ventana shelter with the evidence of a non-pottery, and in this case a pre-pottery, people, whose trash was capped by the debris of people who made pottery. As in the case of the Cochise-Mogollon connection, we must admit either that the people with a hunting and food-gathering economy were extinguished and were replaced by a newly arrived stock, bringing pottery and agriculture, or, that the transition was made within a single group by the adoption of pottery and agriculture.

The nature of the trash deposits and their contents offers some help in solving this. First, it must be pointed out that there was no change in the physical character of the debris at the point where pottery appeared, that is, no sterile layer or hiatus of any kind was indicated. Second, no change was detected in the material culture at the level of the appearance of pottery except the introduction of a new mano form, as has already been pointed out. The rich complement of stone tools remained essentially the same before and immediately after pottery arrived. These conditions argue for the second of the two alternatives posed above, namely, that pottery was merely taken over by the same people who, for a long time previously, had found haven in the cave.

The important feature here is the fact that the people of Ventana Cave who were responsible for the great depth of trash which accumulated before the arrival of pottery and since the time of extinction of some of the game animals, were directly linked on the one hand with the two later stages of the Cochise Culture and on the other hand with Californian groups which have been accredited as having considerable antiquity. Thus the transition from late horizons of the Paleo-Indian of southern Arizona to the Hohokam and doubtless also the Mogollon would appear to be made.[9]

The general picture may be aided somewhat by the introduction of a simple chart. The three stages of the Cochise Culture are shown with the dates as given by Antevs. A division in the San

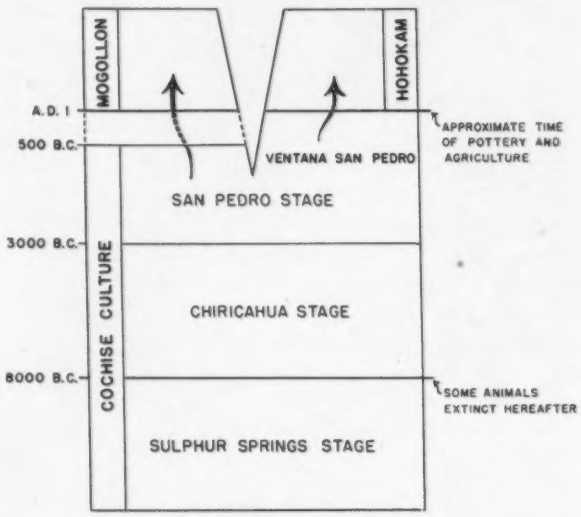


FIG. 1.

Pedro Stage is made to accommodate minor differences which appear to exist between the manifestations of that horizon in southeastern Arizona and Ventana Cave; and the arrows penetrating the pottery horizon from the San Pedro Stage are intended to reflect the persistence of San Pedro Stage traits. We are not concerned at the moment with the late phases of the Hohokam and Mogollon chronologies, but if we bring into the time chart the earliest levels, believed to date near the time of Christ, a relatively small interval of time must be accounted for in the case of the Mogollon, to connect this culture with the Cochise development, while for the Hohokam, the evidence of Ventana Cave appears to provide us with a continuous sequence.

This brief paper cannot attempt to discuss certain implications inherent in the historical recon-

[8] Gladwin, H. S., E. W. Haury, E. B. Sayles, and N. Gladwin. Excavations at Snaketown 1: 168 *et seq.* *Medallion Papers* 25. Globe, 1937.

[9] Both of these cultures must be viewed during their earliest phases to recognize this probable connection, and not later on when the patterns became elaborated through local changes and borrowings.

struction presented, for example, the meaning of an early chipped stone industry of Cochise, the derivation of the Hohokam and Mogollon from what appears to have been a common parent, the ethnic factors which may have been involved, where pottery and agriculture came from, and where the Anasazi (Basket-Maker - Pueblo) fit into the story. These must be considered in due time. Let it also be borne in mind that the reconstruction presented here must be regarded as only a hypothesis until more substantial work has been done.

To summarize the essence of this thesis, the transition from no agriculture to agriculture and from a pre-ceramic to a ceramic culture status, probably without a radical ethnic upheaval, is indicated in the archaeological remains of southern Arizona by:

1. A widespread Cochise Culture, food-gathering and hunting in nature, with three geologically and typologically defined stages.

2. The latest of these stages, the San Pedro, persisted well into the last millenium before Christ and showed minor regional developments as between the eastern and the western parts of the area.

3. The addition of pottery and agriculture, probably at about the time of Christ, to these manifestations of the San Pedro Stage ushered in the beginnings of the Mogollon Culture in the eastern and the Hohokam Culture in the western parts of the area.

RECONSTRUCTION OF ANASAZI HISTORY

HAROLD S. COLTON

Museum of Northern Arizona

(*Read April 23, 1942*)

"ANASAZI" is a name proposed by Kidder for a group of sedentary agricultural people who have occupied the plateau area of the Southwest for nearly two thousand years. He proposed the name Anasazi, by which the Navajo Indians called the ancient cliff dwellers, because the previous name, Basket-Maker – Pueblo, was clumsy and inappropriate. Although the Anasazi can be recognized soon after the beginning of the Christian Era and can be traced to Indians living at the present day, their culture showed a definite evolution, and their cultural traits were ever changing. Therefore, to give you some idea of their characteristics, I will go back to about A. D. 1100–1150, the time of their greatest extension. At that time, from the Virgin River in Nevada to beyond the Pecos River in New Mexico, and from the mountains of Colorado on the north to the Mogollon Escarpment on the south, we can recognize a number of Indian tribes who had much in common.

They lived in masonry apartment houses, with which were associated one or more circular underground rooms, called kivas, used for ceremonies and as a clubhouse for the men and boys. For serving their food they manufactured white pottery with geometrical designs in black, and for cooking and storage of food they made gray pottery with corrugated surfaces. Like their neighbors to the south, they raised corn, squash, beans, and cotton. The last they wove into garments.

Through the work of Kidder, Gurnsey, Roberts, Morris, and many others, the main outlines of the history of the Anasazi from the time of the earliest Basket-Makers, have long been well known. Recently a new early date for Basket-Maker II, A. D. 217, has been determined by Stallings.[1] From that time we can follow the history of the Anasazi to the classic Pueblos of the twelfth century, and from them to Pueblo Indians living at the present time in the same general area. This is a long history indeed. Rather than go into the details of this history in the very short time at my disposal, I am going to present to you some of the general principles recently used in the reconstruction of their history.[1a]

THE PREHISTORIC INDIAN TRIBE

In the reconstruction of history two essential factors are required, the recognition of human social units by objective characters, distinguishing one group from another, and the construction of a time scale. Through the work of many archaeologists, and particularly Kidder, Gladwin, and Mera, the social units have been recognized, and through the tree-ring work of Douglass and his students, a time scale calibrated in years of our own era, has been established.

We can think of the social unit in the terms of a modern Indian tribe. The individuals of such a modern tribe speak the same language, have the same material culture, and have the same social pattern, but they may or may not be a political group. It is the history of such a prehistoric social group that interests archaeologists.

Let us take the Hopi Indian tribe as an example. It is composed of ten more or less independent political groups. These political groups speak the same language, with slight difference in dialect, have almost the same material culture, religion, and social structure. Ethnologists portray the Hopi tribe as it is known to us at the present time by describing more than a thousand characters.

When an archaeologist makes a list of the attributes of a prehistoric tribe, he is much hampered, because so much has been destroyed. The animal body is reduced to a skeleton; the language has gone, but can sometimes be inferred; the material culture is reduced to objects that survive interment in moist earth, houses in some cases, pottery, and stone implements. To these may be added the perishable objects that happen to have been preserved in dry caves or through carbonization in

[1] Stallings, W. S., Jr. A Basket-Maker II date from Cave du Pont, Utah. *Tree Ring Bull.* **8** (1), 1941.

[1a] Some of the principles published here appeared in a recent paper by the author: Archaeology and the reconstruction of history. *Am. Antiquity* **8** (1), 1942.

a fire. Some elements of social organization can be inferred by architecture, but most have been lost. Some elements of religion can sometimes be recovered from burial customs, religious structures, and ceremonial objects. In general, however, our knowledge of the tribe depends on a very few of the elements by which an ethnologist would describe the tribe were it living today.

Since we know so little about the prehistoric tribe, it is better to use Gladwin's term and call it a "branch"; and so, to avoid using the name tribe for the prehistoric unit, we will call the ancestors of the Hopi tribe the Tusayan Branch.[2] A branch, as I see it, and as I think Gladwin visualized it, is not simply a subdivision of a classification of culture. It includes much more than that, because it is defined by all the surviving attributes of a prehistoric Indian tribe: (1) physical remains of individuals, (2) social organization, (3) religion, and (4) material culture. Material culture, because it is the best preserved and fur-

[2] Colton, Harold S. Prehistoric culture units and their relationships in northern Arizona. *Mus. Northern Arizona Bull.* 17: 59–66, 1939.

TABLE 1

THE RELATIONSHIPS OF THE VARIOUS ANASAZI BRANCHES (TRIBES) AND THEIR FOCI AT DIFFERENT PERIODS OF TIME

As these branches are scattered over a map of northern Arizona, northern New Mexico, southern Utah, and southern Colorado, the true relationship would have to be shown on a solid of three dimensions, north–south, east–west, and time.

ROOT		Anasazi	Anasazi	Anasazi (and Mogollon)	Anasazi	Anasazi	Anasazi ?	Anasazi	Anasazi (and Mogollon)	Anasazi
BRANCH		(Virgin)	Kayenta	Winslow	Tusayan	Mesa Verde	Largo (Gallina Series)	Largo (Tewa Series)	Chaco	Largo (Tsia Series)
DATE	STAGE									
1800										
1700	PV				Walpi Payupki			Tewa	Keresan	Tsia Alameda
1600–										
1500	PIV			Homolovi Tuwiuca	Sikiatki Jeddito			Espanola (2)	Acoma (Early)	Alameda
1400										
1300–										
1200	PIII	Parawan	Tsegi Klethla	St. Joseph	Huckovi Polacca	Montezuma McElmo	Largo (2)	Espanola (2) (La Jara) (Taos)	Bonito	Guadalupe
1100–										
1000	PII	Moapa	Black Mesa	Holbrook	Kiako	Mancos Mesa	Largo (1)	La Mujada	Wingate	
900–										
800	PI	?	Marsh Pass	Adamana	Marsh Pass			Piedra	Red Mesa Kiatuthlanna	Kiatuthlanna
700–										
600	BMIII	Lino	Lino		Lino	La Plata		Piedra	Piedra	Piedra
500–										
400	BMII	?	White Dog			?				
300–										
200										
100–										
0										
100–										
200										
Geographical Center		Virgin River, so. Utah and Nevada	Klethla Valley, Arizona	Little Colorado at Winslow	Hopi Mesas, Arizona	Mesa Verde, Colorado	Gallina Cr., New Mexico	Rio Grande at Española, New Mexico	Chaco, New Mexico	Rio Grande at Albuquerque
Authorities		Gladwin[4] (34)	Gladwin[4](34) Colton[5] (39)	Colton[5] (39)	Colton[5] (39)	Gladwin[4] (34)	Mera[6] (35)	Mera[6] (35)	Gladwin[4](34)	Mera[6] (35)

nishes the greatest number of traits, has mixed up our thinking, causing us to consider that the Gladwin system of Roots, Stems, Branches, and Phases (Foci) is a classification of cultures. It is not that, but it is a classification of prehistoric human groups.

After a branch is recognized, it can usually be segmented according to a time scale. In the Southwest, where we have tree-ring dating, we can express these segments in years of our era. Where we have a sequence established by stratigraphy alone, we can number them, letter them, or name them.

These segments of a branch we call "foci," after McKern, rather than "phases," as defined by Gladwin. The reason for this I have discussed in an earlier publication.[3] A focus of a branch is distinguished from an earlier or a later focus by the differences observed in material culture traits, which are sometimes very slight. The branches are differentiated from each other by differences in traits persistent over a long period of time. Thus the Lino Focus is distinguished from the Marsh Pass Focus by a very few minor traits, while the difference between the Lino Focus and the Tsegi Focus is very great (table 1).[4, 5, 6]

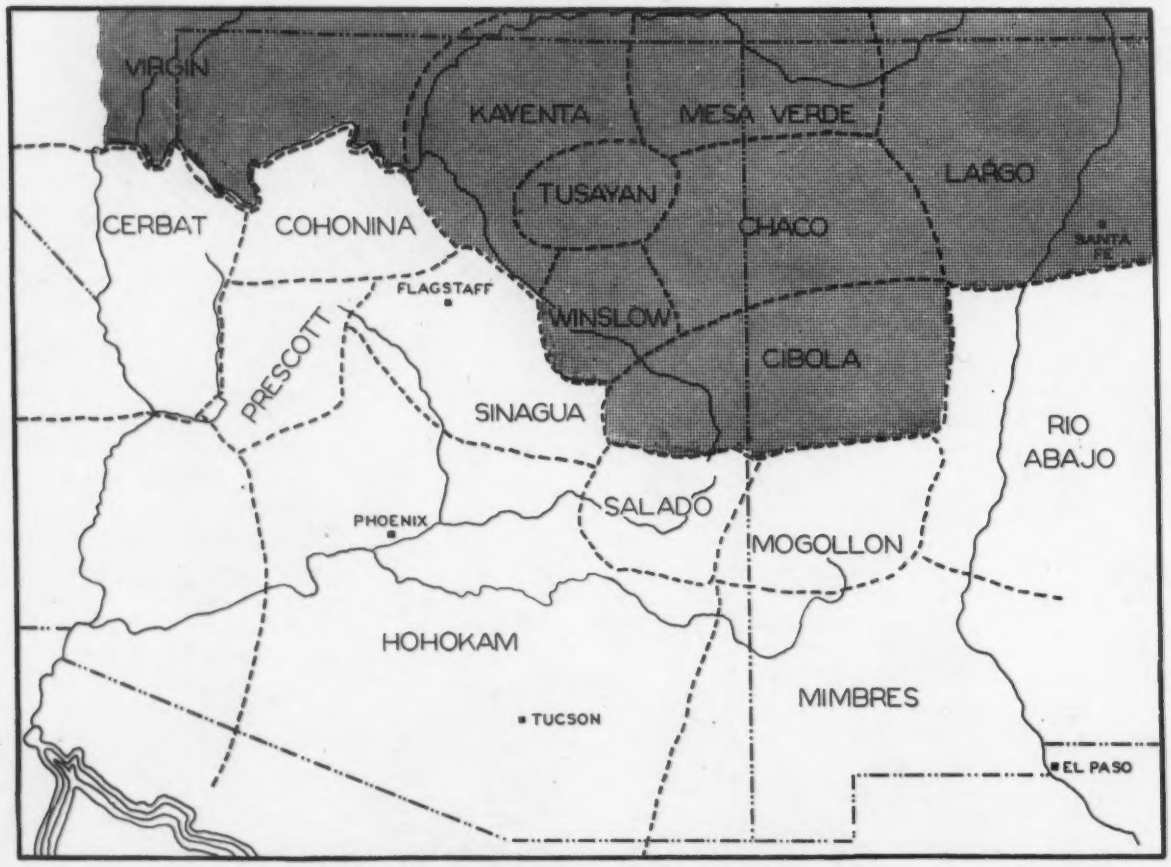
Through the work of Hargrave at the pueblo of Kokopnyama and of Brew at Awatovi, we can carry the Tusayan Branch back to 1300 with great confidence. The material culture traits that survived burial in moist earth differ little from the same traits of the historic period. To retrogress further in the past, at the present moment, is more difficult, because the results of excavations in the earlier centuries in the Hopi country have not been

[3] Colton, *op. cit.*, pp. 6–8.

[4] Gladwin, Winifred, and Harold S. Gladwin. A method for designation of cultures and their variations. *Medallion Papers* 15. Globe, 1934.

[5] Colton, *op. cit.*, pp. 24–25.

[6] Mera, H. P. Ceramic clues to the prehistory of north central New Mexico, pl. 18. *Lab. Anthropology, Technical Ser. Bull.* 8, 1935.



MAP 1. The distribution of branches (prehistoric Indian tribes) in Arizona and part of New Mexico in the early part of the twelfth century. The distribution of the Anasazi branches is shown cross-hatched.

published. A forthcoming work of Brew will fill a very important gap. From fragmentary evidence we can trace back the Tusayan Branch to A. D. 500 or 600.

At no time was the Tusayan Branch isolated. There were always neighboring tribes with which to trade ideas and objects. In the historic period, (1) to the west of the Hopi lived the Havasupai, (2) to the north the Paiute, (3) to the northeast the Ute, (4) to the east the Navajo, (5) to the southeast the Zuñi, and (6) to the south the Apache, with all of whom the Hopi carried on a lively trade and with whom they sometimes went to war. Some of the tribes, such as the Zuñi, had a great influence on the Hopi, while others, such as the Apache, had but a slight effect.

Throughout its history the Tusayan Branch was also surrounded by other branches in the period A. D. 1000–1200. (1) The Cohonina Branch and (2) the Virgin Branch were located to the west, (3) the closely related Kayenta Branch to the north, (4) the Mesa Verde Branch to the east, (5) the Cibola Branch to the southeast, (6) the Winslow Branch to the south, and (7) the Sinagua Branch to the southwest. With all these close contacts, it is remarkable that the recorded cultural traits were so persistent, and, where diffusion occurred, the acquired traits showed only as minor elements, such as decoration on pottery, a new ceremony, or an architectural detail. Except for a few cases, which I will discuss later, the basic pattern of life remained very constant, and the methods used in the manufacture of objects, particularly those made by women, are the most persistent of all.

When we study the Anasazi as a whole, we can recognize about eight branches. Each of these was a prehistoric Indian tribe, which can be distinguished from its neighbors by objective characters, and their histories can be traced for hundreds of years.

Persistence and Diffusion

In the Anasazi Root, one of the westerly branches closely related to the Tusayan Branch is called the Kayenta. It occupied an area between the San Juan and the Little Colorado Rivers. It has been fairly well studied and illustrates well the process of persistence and diffusion, which are important factors in the reconstruction of the history. From A. D. 500 to 1300, this branch, with minor variations, used techniques in the manufacture of pottery which contrasted sharply with the non-Anasazi Sinagua Branch adjoining it on the southwest, whose frontier was contiguous for fifty or sixty miles. The Sinagua Branch shaped their pottery with a paddle and an anvil and fired their red pottery consistently in an oxidizing atmosphere, while the neighboring Kayenta Branch shaped their pottery by scraping and fired their gray-and-white pottery in a reducing atmosphere. Side by side these two branches dwelt for six hundred years, and one had little effect on the other.

In architecture, on the other hand, we have a different story. Up to 1100 the Sinagua dwelt in rectangular earth lodges of timber, later of stone, while the Kayenta lived in oval or circular pit-houses. In the 900's the Sinagua borrowed the idea of a ventilator from the Kayenta. In the late 1000's the Kayenta built masonry pueblos; the Sinagua copied them. Although the latter borrowed certain architectural traits, we have no definite proof that they borrowed the kiva, which shows that the two branches probably had different religions. Religion is very persistent and is one of the elements of culture most resistant to change. Thus we have the persistence of certain traits and the diffusion of others. Techniques once learned were not often lost, as we can see in Morris's recent work, *Anasazi Basketry*.[7]

The diffusion and persistence of traits as shown on the Kayenta-Sinagua frontier can be summarized as follows:

(1) Eight important traits of the Kayenta did not diffuse at all.

(2) Three important Kayenta traits crossed to the Sinagua.

(3) No important distinctly Sinagua traits seem to have crossed to the Kayenta over a period of six hundred years.

In the Southwest there are a number of culture traits that at a given time-level have a wide distribution, such as the earth lodge, four-post roof support, coiled and bundle basketry, cotton textiles woven on a loom, and the groved metate and offerings placed with the dead. These traits are part of the generalized Southwestern pattern and play no important part in the reconstruction of history.

---

[7] Morris, Earl H., and Robert F. Burgh. *Anasazi Basketry*, p. 57. Carnegie Inst. Washington Publ. 533. 1941.

Properties of Frontiers

A geographical frontier between the Sinagua and the Kayenta Branches, archaeological surveys show, was a very real thing and ran northeast from the northern flanks of the San Francisco Peaks, following Deadman's Wash to the Little Colorado River, then southeast along the south side of the river valley to the neighborhood of Leupp; thus the two branches had a contact line about sixty miles long. Of course, the line was not a sharp one, as the sites were more or less mixed in a strip about ten miles wide. This line, with minor variations, maintained its integrity for six hundred years, from about A. D. 700 to about A. D. 1300, the time when the country was finally abandoned by sedentary people.

When we study the boundaries between other branches,[8] we find that they often follow geographical barriers, such as waterless country, pine forests, and deep canyons, such as the Grand Canyon; however, this Kayenta-Sinagua boundary followed no definite barrier, and, for several hundred years after the eruption of Sunset Crater in A. D. 886, the area was relatively densely settled. It almost seems as though the Indians agreed that Deadman's Wash and the Little Colorado River should be the boundary between the two tribes. Sites that occupied a frontier such as this furnish excellent material for the reconstruction of history.

Besides the Kayenta, it is possible to map, at any given time period, the frontiers of the other Anasazi branches, such as Chaco, Mesa Verde, Cibola, Largo, and Rio Abajo, as well as the frontiers between the Anasazi branches and the non-Anasazi branches. Some of these frontiers, such as the Kayenta-Sinagua frontier, were relatively stable, while others, such as the Mesa Verde-Chaco frontier, seemed ever changing, moving back and forth as the tribes waxed and waned. We can distinguish, then, two kinds of frontiers, static and fluid. We should be able to find reasons for this difference.

We can visualize a frontier as a semi-permeable membrane on which the attributes of the branches are beating like so many molecules in a liquid. The human bodies diffuse slowly through the membranes, as people pass to and fro. Certain culture traits, such as ornamentation, easily diffuse through the membrane, while others, such as methods of manufacture, language, social structure, and religion, cannot pass except in a relatively small way. We have a *crisis* when the membrane breaks.

[8] Colton, *op. cit.*, p. 70.

Crises

When we study the archaeology of the Hopi country from the earliest manifestation, we find it followed a definite evolutionary pattern until about 1300, when certain conservative attributes which had to do with religion and methods of manufacture changed. The D-shaped kiva gave way to the rectangular kiva with a platform, and the methods of firing pottery, which had been unchanged for seven hundred years, also were modified; an oxidizing atmosphere replaced the reducing atmosphere. At the same time many other traits, such as pottery design, accepted from neighboring branches, replaced older traits. From this, we assume a break of some magnitude in the evolutionary sequence, which we will call a crisis. Starting at the present time, we can safely project back such important attributes as language, social organization, and religion to about A. D. 1300, but we cannot carry those attributes beyond A. D. 1300 because of this break in the evolutionary sequence. A crisis in the history of a branch may be due to droughts, arroyo cutting, a volcanic eruption, or it may be due to war, pestilence, or the migration of large groups of people. The changes are too sudden and too great to be explained by diffusion.

Students of archaeology on the plateau can find many such crises in the history of the different branches. Some crises, such as the drought of A. D. 1275–1299, have affected great areas. No Anasazi Branch was immune from its effects. The Kayenta Branch became extinct; its survivors merged with the Tusayan Branch, which grew in population at this time. The people of the Mesa Verde and Chaco Branches left their old haunts, never to return. At the same time the surviving Anasazi received strong cultural influences from the south. The 1275–1299 crisis had far-reaching effects.

An intensive study of individual Anasazi branches shows minor crises, crises affecting small local areas. As shown by the author, the eruption of Sunset Crater in A. D. 886 spread black volcanic sand over some thousand square miles. This produced a region of good agricultural land, and a hundred years later Anasazi, along with branches from other roots, moved in, forming for a couple of hundred years a very

dense population.[9] The Tsegi Canyon area, where the Kayenta Branch reached its greatest development, was almost abandoned early in the twelfth century, but at the end of the fourteenth century it was resettled with a dense population. The explanation of this crisis, from the work of Hack,[10] seems to have been the draining of a series of lakes, by arroyo cutting, similar to that which occurred within the last fifty years in the same region. Kirk Bryan has recognized a similar cycle at Chaco.[11] The discovery and recognition of crises is important in the reconstruction of Anasazi history.

Dominant Cultures

Sometimes a branch flowers. By this I mean that a focus of the branch may dominate neighboring contemporary foci of other branches supplying traits to these neighboring areas. Kroeber recognized this factor and called it a climax.[12] For several reasons which I cannot discuss here, I think dominance is a better word, for dominance of a focus in one branch at one time-level is often replaced by dominance at a later focus of another branch. This can be seen well in the western Anasazi Kayenta Branch, which was a dominant branch between A. D. 1000 and 1300, influencing the Tusayan and other branches. On the other hand, after 1300 some of the non-Anasazi branches to the south had dominant cultures which had great influence on the Anasazi of their time. Dominance was not static, but changed with the passage of time.

Trade

Of great importance in the reconstruction of history are the objects received and given in trade or commerce. It is necessary to determine with great accuracy what is indigenous and what is exotic. This involves highly technical subjects, such as petrography applied to stone objects and pottery temper, spectroscopic studies of such metals as copper, found mainly in the form of bells, and a knowledge of the distribution of animals and plants. Here the archaeologist must call for help from other branches of science, and neither chemist nor physicist nor biologist are omitted.

The Anasazi were great traders; their manufactured pottery, small, easily transported bowls and jars, travelled all over the Southwest, and in exchange for them the Anasazi received shell from the Gulf of Mexico, Gulf of California, and the Pacific Coast, and even parrots from the tropical parts of Mexico, a thousand miles away. Many other things which they could not manufacture or produce in their own country, they received in trade.[13] Brand has mapped a number of these trade routes.[14]

Conclusion

The reconstruction of the history of the Southwest depends on the recognition of prehistoric Indian tribes, called "branches," and the construction of a time scale. In the Southwest, thanks to archaeological surveys, excavations, and tree-ring studies, these conditions are now fulfilled, and the secondary factors of diffusion, persistence, frontiers, crises, dominance, and trade can be distinguished in many branches of the Anasazi and their neighbors.

In our reconstruction of history we must realize that the principal framework of Anasazi history is constructed of three elements: these are tree rings, to give the time scale, and the indigenous traits of architecture and pottery. If we are realistic, we must admit that, at the present time, archaeologists hang most of the other observed culture traits from a framework constructed by those three elements.

Our knowledge of the archaeology of the Anasazi seems very complete when compared with other areas of our country, yet when we break the Anasazi into its component tribes or branches, and the branches into foci, we see how little we really know and how many problems are crying for solution.

---

[9] Colton, Harold S. The rise and fall of the prehistoric populations of northern Arizona. *Science* **84** (2181): 4, 1936.

[10] Hack, John T. The late Quarternary history of several valleys of northern Arizona. *Mus. Northern Arizona, Mus. Notes* **11** (11): 69, 1939.

[11] Bryan, Kirk. Recent deposits of Chaco Canyon, New Mexico, in relation to the life of the prehistoric peoples of Pueblo Bonito. *Jour. Washington Acad. Sci.* **16**: 75–76, 1926.

[12] Kroeber, A. L. Cultural and natural areas of native North America. *Univ. California Publ. Am. Archaeology* **58**: 223, 1939.

[13] Colton, Harold S. Prehistoric trade in the Southwest. *Sci. Monthly* **52**: 308–319, 1941.

[14] Brand, Donald D. Aboriginal trade routes for sea shells in the Southwest. *Yearbook Pacific Coast Geographers* **4**: 3, 1938.

BURIAL OF AN EARLY AMERICAN MAGICIAN

JOHN C. McGREGOR

Archaeologist and Curator of Dendro-Chronology, Museum of Northern Arizona

Introduction

During the excavation of the Ridge Ruin, a small masonry house of Pueblo III age, located about 20 miles east of Flagstaff, Arizona, a most remarkable and unusual burial was found. The burial offerings, accompanying the remains of a man, numbered over 600 articles, many of which were of such fine workmanship and unique execution that it is our belief that this is the richest burial ever reported in the Southwest. While the beauty of some of the objects suffered from their long inhumation, enough of their original character has been retained so that reconstruction reveals how really remarkable the whole collection was. For such a multitude of beautiful objects to be buried with a southwestern Indian is most extraordinary in itself, and makes us wonder where they came from and why they were buried in this way.

Shortly after the burial was excavated and the objects were cleaned and repaired, Miss Eleanor Bareiss, of Philadelphia, came to the Museum as a volunteer assistant. She undertook to make reconstruction drawings of the burial offerings, under the author's direction, and achieved the splendid results which illustrate this report. Our sincere thanks and deep appreciation are due Miss Bareiss for these fine drawings.

The Site

The Ridge Ruin [1] is a masonry pueblo of some 20 or 25 rooms which crowns a small eminence on the edge of a large cinder-covered valley. Many of the rooms were of two stories, and many of the walls were exceptionally thick in order to support the upper story. In some cases the walls had been later thickened by additions to one side, and in every case the earlier masonry was a very fine sandstone block type, while later additions were made mostly, if not entirely, of basalt boulders.

The room in which the burial was found lay just to the north of the main mass of the pueblo proper. It was at least half below ground, with the walls constructed of basalt boulders, except for the ventilator which was constructed of and lined with sandstone slabs (fig. 1). There is still some uncertainty as to whether this room was ceremonial (a kiva) or a dwelling room of earlier date than the pueblo.

The body of the man was placed in a pit some three feet deep, which had been dug in the middle of the floor (figs. 1, 2, 3) (McGregor, 1941: 144, and fig. 51). All of the offerings were placed with the body in the pit, which was roofed with poles at about the level of the floor and covered with earth. It is an interesting fact that there is no evidence of occupation of the room after the burial was made in it, but rather that it was quickly filled with refuse from the pueblo above it. From all of this, and by a careful examination of the ceramic complex shown by the 25 pieces of pottery represented, it is possible to suggest a date for the time of the burial as about the first quarter of the twelfth century.

Problems

The finding of so much material buried with one man in such a small and relatively insignificant site immediately raised several problems, answers to which will be attempted after the artifacts have been described. The only other burial which may be considered in any way equal to this one in the wealth of material found, may be assigned to a very closely related culture and comes from a cave in the Verde Valley. It unfortunately has not as yet been reported.[2] Had the burial at

[1] Excavation of this site was undertaken with the cooperation of the U. S. Works Projects Administration. We received much help from both state and local WPA officials: Mr. W. J. Jamieson, Mrs. Agnes Hunt Parke, Mr. Lloyd Adams, and Mr. Roy Lassiter. Special credit is due to Mr. Milton A. Wetherill, who acted as foreman of the excavation and later assisted in working up the results. We are indebted to our special WPA laboratory assistants, Mrs. Virginia Perry and Mr. Grover C. Sullivan, for the pottery restoration and other technical work. See McGregor (1941: 148, fig. 52A. Site N. A. 1785).

[2] This burial was found in a dry cave, and, though it contained many fine textiles and other highly perishable materials, it was relatively poor as compared with the

FIG. 1. Room 13 at the Ridge Ruin, in which the burial was found. The burial hole had been filled, and the room had been completely cleaned. Two parrot skeletons were found in the corner where the rock pile is visible.

FIG. 2. General view of the burial pit in the floor of room 13, showing the removal of the artifacts as they were uncovered. The head of the man lay at the far end of the pit.

present being described been located in a dry cave instead of in an open ruined site, the amount of objects found with it would have been correspondingly larger.

So much fine material found with one man led to the immediate question of just what sort of man this individual must have been in life to have been deemed worthy of these rich offerings. It is now quite contradictory to general Pueblo concepts to encourage the acquisition of personal wealth. Certainly many of the things found with the burial were ceremonial, and, of course, a great deal of interest was expressed in the possibility of identifying the ceremony to which they belonged, and thus of identifying the ceremonial affiliations of the man. Associated with these problems was that of finding so many extraordinarily fine things in such a small site, when much more imposing sites of the same general culture in the same area failed to produce such objects or such an elaborate burial. This led to the question of whether or not they were made locally or traded to the Ridge Ruin from other sections. Even a preliminary examination of the objects suggested that they were made by unusual or new techniques, and if they were new, what were they? Another obvious question was what the man looked like in life and how he had been dressed at the time of burial.

THE ARTIFACTS

Although no highly perishable objects, such as cloth fabrics, were found with this open-site burial, a total of 613 catalogue numbers were assigned to as many separate objects. This considerable collection is of value not only because of the large number of objects, but more especially because they were obviously all in use at one time, at one place, and by one people. However, the fact that they were all found at one time and in one place does not prove beyond question that they were actual components of the culture of the people who placed them there, for they certainly might have been derived from far away through trade or by some other means.

Pottery

Twenty-five whole or completely restorable pottery vessels were found with this burial. The styles of design and vessel shapes are shown in figure 4. Of these only two types, Sunset Red, represented by two plain jars, and the Turkey Hill Red bowl, are known to have been made by people of this culture. The other types were derived from geographically close cultures (Colton and

burial reported here. Objects found in it are now in the Arizona State Museum at Tucson, and the preliminary report, made by C. R. King, is also there.

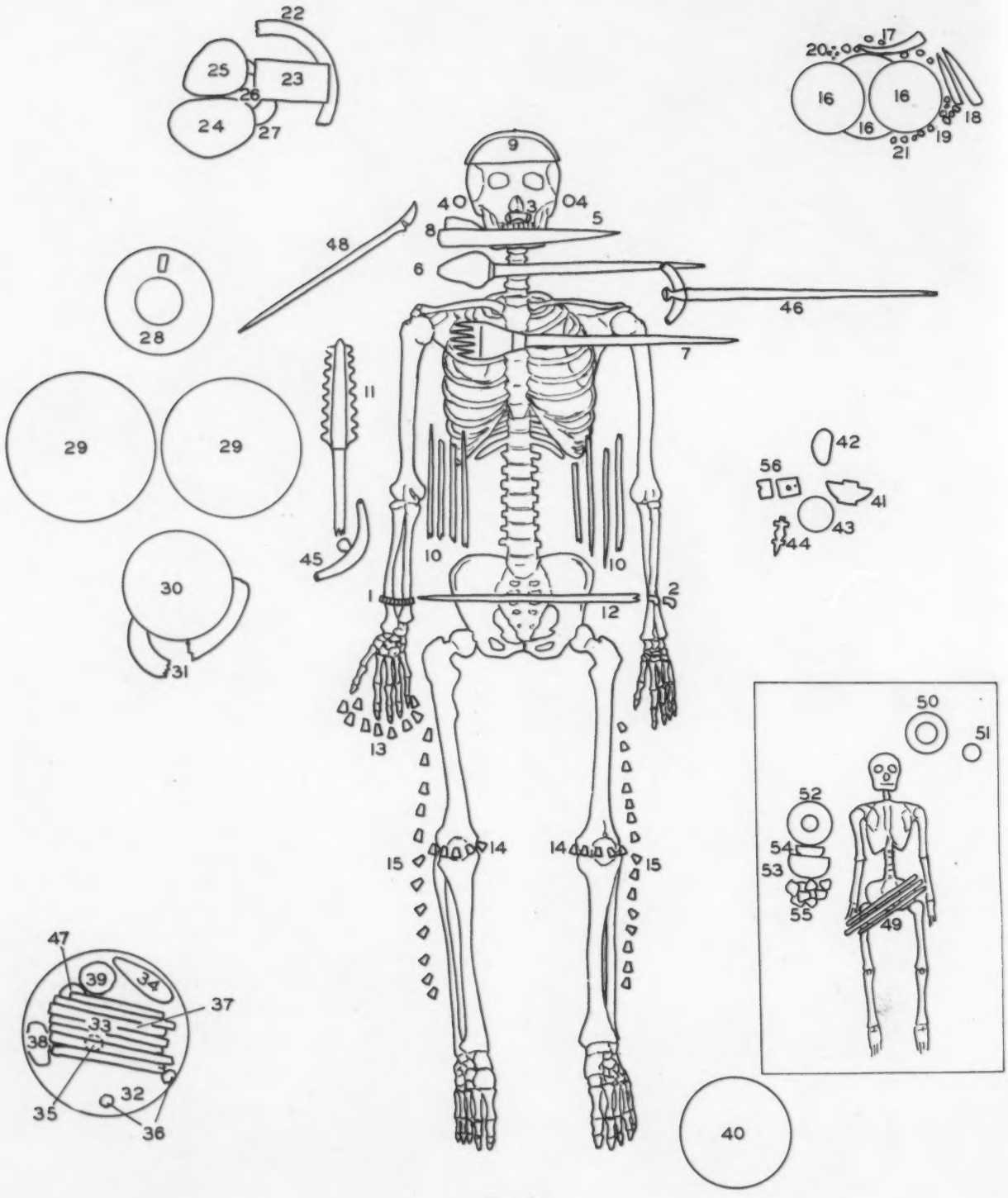


FIG. 3.

(For description, see opposite page.)

Hargrave, 1937; Colton, 1941). The ceramic complex represented indicates that both late Pueblo II and early Pueblo III pottery types were in use at this time, suggesting a date of the first quarter of the twelfth century.[3]

A list of pottery types is as follows:

Little Colorado White Ware
- Holbrook Black-on-white—two bowls
- Walnut Black-on-white—nine bowls

Tusayan White Ware
- Kayenta Series
  - Black Mesa (Deadmans) Black-on-white—one bowl
  - Dogoszhi Black-on-white—one jar
- Wupatki Series
  - Flagstaff Black-on-white—six, three bowls and three seed-jars

San Juan Red Ware
- Deadmans Series
  - Citadel Polychrome—two bowls

Tsegi Orange Ware
- Tusayan Polychrome—one pitcher

Alameda Brown Ware
- Rio de Flag Series
  - Sunset Red—one pitcher and one jar
  - Turkey Hill Red—one bowl

For further characterization of this pottery, see table 1.

[3] Black Mesa (Deadmans) Black-on-white is a Pueblo II type, and Flagstaff Black-on-white is a Pueblo III type.

Baskets

One of the most interesting collections of basketry ever to come from a single Southwestern burial is the group of eight fragmentary baskets found here. For convenience in discussion, they may be divided into three broad classes: (1) basketry not in any way ornamented by additions to the surface, (2) basketry which was coated on the

FIG. 3. Diagram of the burial, showing the location of the various objects found in relation to the position of the body. The box to the right illustrates the uppermost layer of offerings, painted sticks across the pelvis, and pottery. The main diagram, of the lower levels, includes pottery, sticks, ceremonial objects, jewelry, baskets. In addition there were many other small objects which were covered by those visible in this diagram. The numbered objects are identified in the following list:

1. Turquoise bead bracelet.
2. Turquoise animal heads.
3. Nose plug.
4. Ear pendants.
5. Large decorated bone awl.
6. Shell on stick.
7. Painted wood hand on stick.
8. Obsidian knife blade.
9. Beaded head cover.
10. Sticks painted blue.
11. Carved painted stick.
12. Stick painted red.
13. Loop of conus tinklers (perhaps held in hand).
14. Loops of conus tinklers around knees.
15. Strings of conus tinklers down legs.
16. Three black-on-white seed bowls.
17. Rim of a large shell.
18. Two large knife blades.
19. Two cut-out shell pendants in seed bowls.
20. Mass of fine specular iron crystals on shell fragments.
21. Scattered mass of copper ore.
22. Fragments of painted basket.
23. Turquoise mosaic basket tube.
24. Abalone shell.
25. Three marine shells nested together.
26. Bird-shaped bracelet ornament of shell and turquoise inlays.
27. Pendant of shell and turquoise.
28. Sunset Red pitcher.
29. Two Tusayan Polychrome bowls.
30. Walnut Black-on-white bowl.
31. Fragments of a painted basket.
32. Coiled basket.
33. Reeds filled with blue paint.
34. Blue paint in a gourd.
35. Red paint in small skin sacks.
36. Fragments of hematite paint.
37. Claws and teeth of mountain lion.
38. Mass of hair.
39. Mass of string or yarn.
40. Small black-on-white bowl.
41. Bird-shaped mosaic.
42. Ear-shaped mosaic.
43. Round mosaic.
44. Shell lizard.
45. Painted and shell inlay horn-shaped object.
46. Stick with turquoise inlay.
47. Lignite button.
48. Stick with carved deer-foot end.
49. Three carved sticks about 10 inches above body, consisting of: carved hand, carved deer foot, carved stick. (See box inset.)
50. Dogoszhi Black-on-white jar at same level.
51. Black-on-white bowl.
52. Sunset Red jar.
53. Black-on-white bowl resting on edge.
54. Black-on-white bowl on edge inside 53.
55. Crushed black-on-white bowl.
56. Two stone pendants painted green.

Arrow points were found scattered from about 10 inches to 2 feet above the body, generally mixed with the rotted wood of the roof. They were in groups of eight to twelve, as though they had been bundles of arrows, and were found mostly to the right of the body.

TABLE 1

POTTERY COMPARED BY SIZES AND DESIGNS.* For illustration see figure 4.

Type	No.	Outside diameter in cm.	Height in cm.	Inside diameter of neck in cm.	Wall thickness in cm.	Design layout	Design elements	Form
Holbrook Black-on-white	74	15.1	8.7		0.5	Band—I	Triangle—7	Bowl
	81	24.0	13.5		0.5	Rectangular Quadrant—VIII	Block—3, Corner—3	Bowl
Walnut Black-on-white	64	17.7	9.9		0.5	Band—I	Meander—6	Bowl
	69	19.8	12.0		0.5	Band—I Quadrant—III	Triangle—12, Block—6	Bowl
	73	26.4	14.8		0.58	Quadrant—III	Triangle—5, Corner—2	Bowl
	75	18.7	8.3		0.48	Band—I	Meander—1, Triangle—1, Triangle—7	Bowl
	76	25.0	13.0		0.55	Band—I	Block—4	Bowl
	546	12.8	12.7		0.55	Band—I	Triangle—13	Bowl
	548	20.7	12.3		0.4	Rectangular Quadrant—VIII	Triangle—5, Corner—5	Bowl
	549	23.3	13.8		0.55	Tripart—VI	Block—6	Bowl
	552	24.4	14.6		0.6	Band—I	Block—5	Bowl
Black Mesa (Deadmans) Black-on-white	550	13.5	13.3		0.55	Quadrant—IV	Triangle—1, Block—4	Bowl
Dogoszhi Black-on-white	80	27.4	25.1	19.8	0.5	Band—I	Meander—4, Corner—7	Jar
Flagstaff Black-on-white	65	12.0	6.8	5.2	0.5	Band—I	Block—6	Seed Jar
	66	11.6	7.1	4.9	0.5	Band—I	Block—6	Seed Jar
	67	13.0	8.0	5.9	0.5	Band—I	Block—5	Seed Jar
	77	18.0	11.0		0.55	Band—I	Triangle—13	Bowl
	547	12.9	12.2		0.6	Rectangular Quadrant—VIII	Triangle—6, Corner—1	Bowl
	551	16.9	9.5		0.55	Rectangular Quadrant—VIII	Corner—2	Bowl
Citadel Polychrome	70	22.9	14.0		0.5	Quadrant—IV	Block—8	Bowl
	71	25.3	12.8		0.55	Irregular—IX	Block—8	Bowl
Tusayan Polychrome	78	11.0	10.8	4.3	0.45	Band—I	Lines—1, Corner—4	Pitcher
Sunset Red	68	19.1	17.5	8.0	0.5			Pitcher
	72	15.0	13.7	8.5	0.4			Jar
Turkey Hill Red	79	14.9	9.9		0.3			Bowl

* The classification of designs used here, in which the design layouts and the design motifs are considered by types, is taken directly from *Bulletin 18, Museum of Northern Arizona*, p. 32 and fig. 5 and following.

TABLE 2

THE THREE CLASSES OF BASKETS, INDICATING THE FINE WORKMANSHIP BY NOTATION OF THE WEAVING MEASUREMENTS*

Basketry Type	Rod diameter in mm.	Width of sewing element	Thickness in mm.	Coil width	Split stitches	Remarks
No Surface Additions						
One rod and split bundle	2.0	1.6	3.2	4.5	No	
Two rod and split rod	2.5	1.5	5.0	4.5	No	Inside finished
Two rod and split rod	1.5	1.5	4.5	2.5	No	
Two rod and split rod	2.0	2.5	6.0	4.0	Rare	Clockwise weave, outside finish
Surface Coated and Painted						
Three rod	2.0	2.0	5.0	4.5	Many	Outside coated, no painting; base 17 cm. diameter, height 9 cm., coating 0.3 mm. thick
Basket weave all rotted			3.5			Coated and painted inside and outside; coating 0.3 mm. thick
Two rod and fibre bundle	1.0	2.0	2.5	2.6	No	Coated and painted inside and outside; coating 0.3 mm. thick
Surface Coated and Covered with Turquoise Mosaic						
One rod	2.0	0.9	3.1	6.0	No	Coated outside 0.7 mm. thick; mosaic on outside

* McGregor (1941: 235 ff.). A further discussion of these basket types.

surface and sometimes painted, and (3) basketry coated with turquoise and other mosaic fragments.

As may be seen from the accompanying table (table 2), four of the baskets belong to the first class. They are of particular interest only in that three are made of a weave not apparently noted elsewhere, in which two rods and a split rod form the filler. The other basket is of the one-rod-and-bundle type.

Three of the baskets are of the second class, since they were coated on the surface with an unidentified filling material. One was coated on the outside only and was not painted; the other two were coated on both the outside and the inside and were painted.

One of the painted baskets was completely rotted away, except for the coating material on the inside and the outside, but the second was sufficiently well preserved so that weaves and other features might be determined. The inside of this latter basket was decorated in geometric designs of red and green; the outside was covered with a heavy green pigment over which red was painted.

As may be seen by reference to table 2, this group of basketry was exceptionally well made. The rods, the sewing elements, and the basket thickness were all unusually small. The trait of covering the surface with a leveling agent and then painting is unique. None are like other painted baskets, in which the design is painted directly on the basket without filling.

Two other remarkable painted baskets made by this same technique were presented to the Museum by Mr. J. R. Babbitt, of Flagstaff. He secured them in this same general area, and both are even superior to those found with the burial. An example of the finest of these, which was so nearly whole that it could be reconstructed, is shown in figure 5. The flat bottom and sloping sides constitute a shape common to most of the baskets found with the burial.

This particular basket had been coated on the outside and the inside but not along the rim. The inside was then painted over with a uniform green, while the outside was covered with a light blue. On this background lines were drawn with a slightly darker blue pigment, and they were so heavy that they stood up in well-marked relief. This technique is somewhat suggestive of the enamel painting done in Mexico (Ekholm, 1940). Further designs were added in a bright red, and these were outlined in a golden yellow color. The very remarkable result is shown in the illustration.

The third type of basket, that ornamented with a mosaic, is illustrated by only one example. It was probably a tube, open at both ends, and

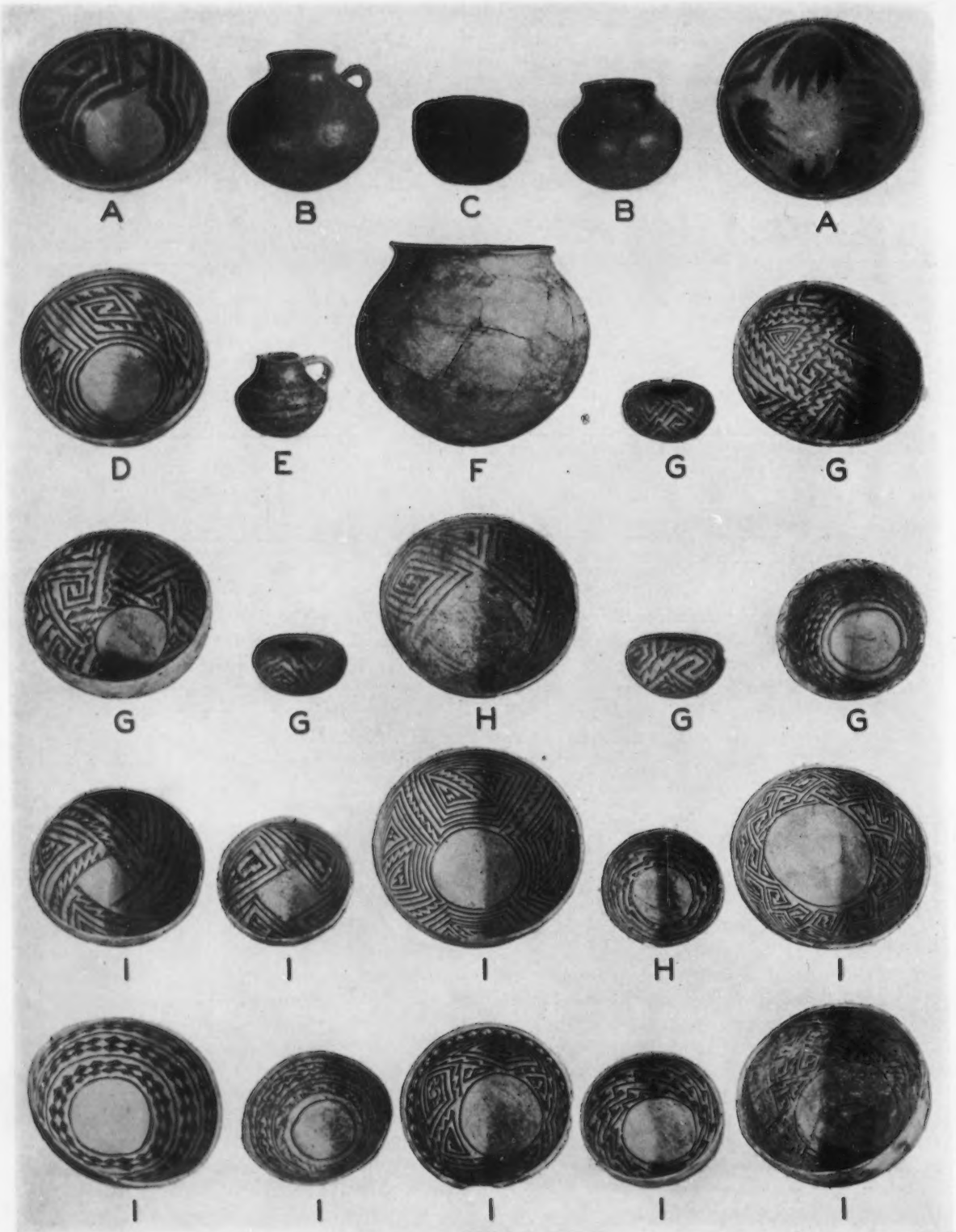


FIG. 4.

(For description, see opposite page.)

FIG. 5. A painted basket characteristic of this culture, but which was not found with the burial. In this case the outside and the inside have been coated with a filler to level the surface. The inside was then painted green, and the outside was coated with a light blue. The darker blue design on the outside is slightly raised, as is the interlocking red and gold. The white in this illustration is golden yellow, the darkest shade interlocking with it is red, and the somewhat lighter tone is dark blue. Though the rim was painted blue, it was not coated with filler. The shape, with a flat bottom and flaring sides, is very characteristic. This is a restoration from the original somewhat warped and broken fragments.

FIG. 4. The twenty-five vessels found with the burial represent nine different types. For dimensions of each vessel, see table 1. Reading from left to right:

Top row: A. Citadel Polychrome—no. 20.
B. Sunset Red—no. 68.
C. Turkey Hill Red—no. 79.
B. Sunset Red—no. 72.
A. Citadel Polychrome—no. 71.

2nd row: D. Black Mesa (Deadmans) Black-on-white —no. 550.
E. Tusayan Polychrome—no. 78.
F. Dogoszhi Black-on-white—no. 80.
G. Flagstaff Black-on-white—no. 67.
G. Flagstaff Black-on-white—no. 77.

3rd row: G. Flagstaff Black-on-white—no. 549.
G. Flagstaff Black-on-white—no. 65.
H. Holbrook Black-on-white—no. 81.
G. Flagstaff Black-on-white—no. 74.
G. Flagstaff Black-on-white—no. 77.

4th row: I. Walnut Black-on-white—no. 546.
I. Walnut Black-on-white—no. 551.
I. Walnut Black-on-white—no. 73.
H. Holbrook Black-on-white—no. 74.
I. Walnut Black-on-white—no. 76.

5th row: I. Walnut Black-on-white—no. 545.
I. Walnut Black-on-white—no. 75.
I. Walnut Black-on-white—no. 69.
I. Walnut Black-on-white—no. 64.
I. Walnut Black-on-white—no. 552.

measuring about 8.5 cm. in diameter by 12 cm. in height. Although it was found badly broken and partly decayed, it was possible to fit the pieces together and to determine gross measurements and the pattern of the design. The outside of the basket was coated with the same adhesive and filling material with which the painted baskets were coated. Arranged upon this, and adhering to it, were a total of about 1,500 pieces of carefully cut and fitted turquoise mosaics, as well as rows of rodent teeth, square red argillite inlays, and elongated black stone inlays. For the complete restoration see plate I, figure 1.

This is certainly the most outstanding decorative basket that has ever been found in the Southwest. Not only are all the pieces of turquoise very carefully cut and fitted, but they are also matrix-free stones of a bright blue color, suggesting some of the best of the New Mexico turquoise. The rodent teeth were prepared for use by grinding them down on the back until they were flat, leaving the curve only on the front side. Originally they were a bright orange color, having been taken from either young porcupines or some other rodents, perhaps muskrats. They were arranged in a T-shaped pattern. These two colors in combination with the red and black already mentioned resulted in a most picturesque effect.

Other somewhat similar baskets have been found in the Southwest. One such bottomless basket, or band, is from Waco Cave, near El Paso, Texas, and is now in Gila Pueblo at Globe, Arizona (Alves, 1930, plate 19a, fig. 2). Though it is larger in diameter than the one found here, it is very much narrower, only about an inch and a half high, and much more strongly suggests an arm band. The pieces of turquoise which are stuck to it are very large and are irregularly smoothed chunks. On the whole it is only slightly suggestive of the basket mosaic found at the Ridge Ruin.

A very much better example was found at Pueblo Bonito and is reported and pictured by Pepper (1920: 164). It is smaller in diameter and longer than the Winona example, being about 7.5 cm. in diameter by about 15 cm. in height. It had a total of 1214 turquoise mosaics, but apparently no other mosaic material than turquoise was used. From the illustrations and descriptions Pepper has given, it would appear that these mosaic pieces were not so carefully shaped or fitted as those on the Winona basket.

Speculation as to the use to which these baskets were put is of some interest, for it is difficult to imagine how such basket tubes could have been employed. Certainly their delicate nature would have precluded any strenuous utilitarian or practical use. They therefore seem to have been primarily ornaments, and the suggestion that they served as arm bands is most likely.

Matting

Badly disintegrated fragments of a burial mat were found below and above the body. Careful comparisons failed to indicate any distinction between the fragments, suggesting they were all from one exceptionally large mat woven of beargrass, which had been split into more or less uniform sizes of about 3.5 mm.[4] The weave is twilled, over two under two, and the acute angle, where measured, was about 75 degrees. Other similar mats which were found in this same culture and measured, all had a somewhat similar acute angle. Unfortunately, no portions of the edge were preserved to indicate the method of edge-finishing or selvage.

Heavy Blades

Three heavy blades, which may have been knife blades, were found stacked one upon another. They are all of simple triangular form, with convex sides, a more or less straight base, and no notches for hafting (fig. 6) (McGregor, 1941: 190 and fig. 65). The largest of these blades, made of chalcedony, is not the best, but is well chipped and shaped. The medium-sized blade, of jasper, is the best flaked and most carefully shaped. The smallest, of obsidian, is very poorly made indeed. For further information see table 3.

TABLE 3

MATERIALS AND MEASUREMENTS OF HEAVY BLADES

Material used	Maximum length in mm.	Maximum width in mm.	Maximum thickness in mm.
Chalcedony	119	60	8
Jasper	87	67	6
Obsidian	76	47	9

Projectile Points

A total of 420 arrow points were found, of which 3 are bone copies of the common stone points. Figure 6 illustrates a typical group.

[4] Identification of materials made by Volney Jones, University of Michigan (McGregor, 1941: 244).

PLATE I

FIG. 1. Coiled one-rod basket tube which was coated on the outside with a carefully fitted mosaic of some 1,500 turquoise pieces, orange-colored rodent teeth ground down to fit, red argillite rectangles, and a few narrow black stone inlays. Of the three mosaic-incrusted tubes known from the Southwest, this is by far the best made. They may have been used as ornamental arm bands.

FIG. 2. A wooden cup painted in red and blue was made of cottonwood root, as are modern Hopi Indian kachina dolls. The geometric design is somewhat suggestive of both ceramic and cloth fabric designs of about the same period.

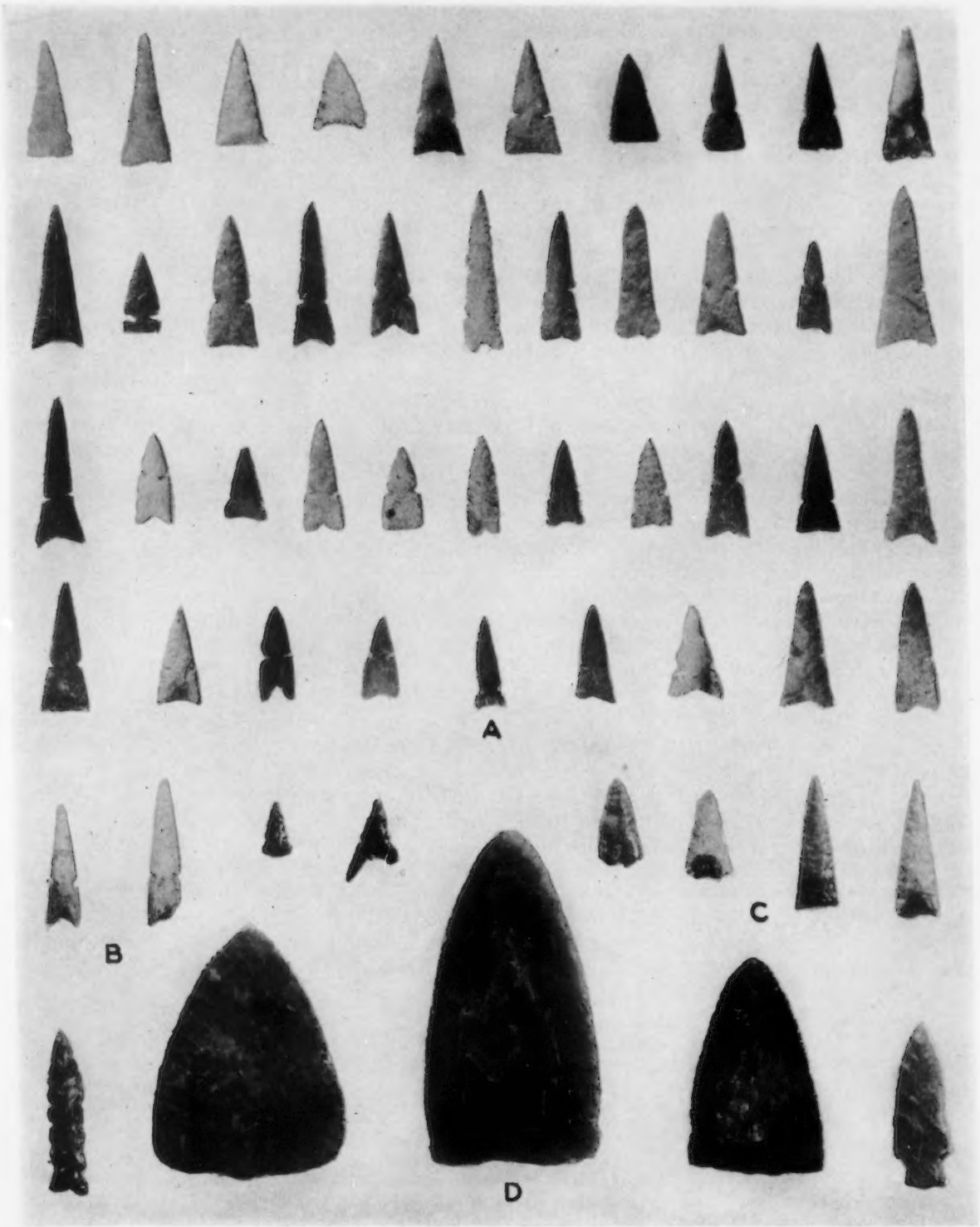


FIG. 6. The points shown above *A* are a representative collection from the more than 400 which were included with the burial. Those shown above *B* are bone points of the same form as the typical stone points. At *C* are four simple triangular points which still have the lac that bound them to the foreshaft. The several larger points and blades are shown at *D* in the bottom row.

Upon first examination this large collection appears exceedingly varied, but more deliberate study reveals that it is limited to only a few actual varieties, though the points do vary considerably in color and size. They may be characterized best as long, straight-sided, triangular points with lateral notches (McGregor, 1941: 183 and fig. 64). The various classes are separable on the basis of whether the base is straight or concave, whether the notches are low or high on the side above the base, and whether the sides are smooth or serrated.

There are a few examples made of flint in gray, many are of chert in white and yellow, and several are of red jasper. Less commonly black obsidian was used in their manufacture, and there is only one case of white obsidian being used. The three bone points are copies of the most common long, slender type (fig. 6). Seven of the stone points still show traces of lac, a plastic sometimes used by these people to attach the head to the shaft of the arrow. In every case they were simple triangular points with flat bases and without notches.

On the whole, all 420 arrow points are exceptionally well made. They are extraordinarily thin for Southwestern points, very symmetrical, and of clean-cut outline. Even variations in color indicate deliberate selection of the material from which they were made.

Stone Ornaments

One of the most characteristic features of the culture of which this burial is a part is the prevalence of a great variety of small stone ornaments. Many were made of red argillite, brought to the Ridge Ruin from only a short distance (Bartlett, 1939). In this particular assemblage an outstanding number of ornaments were made partially or wholly of turquoise, much of it of such excellent blue quality as to suggest the Los Cerrillos mines in New Mexico as a possible source.

Undoubtedly the most interesting personal ornament actually found on the body is the very large nose plug, which was resting just at the base of the nose on the upper margin of the teeth. Originally two round buttonlike turquoise ornaments were attached with lac to the ends of the red argillite body of the plug, but they had become detached, and one had moved or rolled down the side of the face. The lac was found still preserved on the ends of the central portion, so that the buttons could readily be attached to it once more. This combination of stone and lac resulted in a most extraordinarily pleasing ornament, as may be seen in plate II, figure 4. Since this plug is made of stone and is 38 mm. (1½ in.) long, it is apparent that to wear such an ornament fixed in the septum of the nose would have resulted in some distortion of that member. For further characterization see table 4.

Until this nose plug was found on the face of the individual, several others that were turned up during the course of work in other sites of this same culture could only tentatively be identified as actual nose plugs. Since this find, another plug, though of wood, has been found in place in the nose of a mummy excavated by a University of Arizona expedition working in Ventana Cave in southern Arizona.

One other unfinished curved argillite nose plug of this same general type was found while screening the trash from the burial hole. It is not considered a component of this burial, for it was most likely included with the trash that filled the room above the prepared cist. With the collapse of the pole roof, it fell into the burial hole, and so became associated with other actual burial artifacts.

Two pairs of turquoise pendants, as well as a pair of shell ear pendants, were found. One pair of the turquoise earrings was beside the head of the individual, one on each side, very nearly in the

TABLE 4

SHAPE, SIZE, AND MATERIAL OF STONE ORNAMENTS

Object	Shape	Material	Length in mm.	Width in mm.	Thickness in mm.
Composite ear pendants, pair	Disk	turquoise shell and lac	18.2	18.2	3.2
Pendant	Wedge	turquoise	20		
Pendant	Rectangular	turquoise	16		
Pendants, pair	Rectangular	calcite	40	37	2
73 turquoise beads of bracelet	Disk	turquoise	6.2		2.1
107 turquoise beads	Disk	turquoise	2.3		1.0
3600 stone beads	Disk	gray stone	2.0		1.3
Button	Disk	lignite	61		9 to 3.5

PLATE II

COMPOSITE ORNAMENTS, THE PARTS OF WHICH WERE BOUND TOGETHER WITH LAC.

FIGS. 1 and 3. Two of the most expertly made mosaic jewelry pieces included as grave offerings with the burial. Both have a backing of modeled lac, and both are made of exceedingly small turquoise mosaic inlays.

FIG. 2. The two ear pendants of turquoise and shell found on the man.

FIG. 4. Two views of the red argillite nose plug with turquoise ends.

FIG. 5. The most elaborate of the ornamented sticks, the head modeled of a plastic to which the mosaic pieces adhere.

FIGS. 6 and 9. Two views of a somewhat similar stick ornament, which is also made of a plastic and is hollow. Detail of the upper and lower surface of the arms is shown in figure 6.

FIGS. 7 and 8. Various views of a bird-shaped ornament of modeled lac which was found still attached to a shell bracelet fragment. Shell and turquoise formed most of the mosaic, but iron pyrite crystals were used in the head.

original position in which they were worn. They were made of flat, circular disks of turquoise, with small shell disks, possibly attached with lac, in the center of one side (pl. II, fig. 2). Two other turquoise ear pendants were included with the burial but were not on the individual. They were also exceptionally bright blue, and, like the rest of the turquoise, suggested Los Cerrillos much more than any other now known source. One is rectangular, and the other is triangular, but both have slightly rounded corners.

There was another pair of stone pendants; one was broken; the other is illustrated in figure 7. They are flat squares of calcite, with a hole drilled in the center and near the edge of each. Most interesting is the fact that they were painted on one side with a blue-green pigment.

Quantities of stone beads were included with the burial materials, some associated with the body, others apparently additional jewelry included as a reserve supply. Many were made of the same fine blue turquoise, without matrix, that was used for all of the other turquoise objects. A series of 73 large beads were found as a bracelet around the right wrist of the individual. Several other similar large turquoise beads were found in the course of the screening operations, and there was another string of 107 small turquoise beads. There were also two most unusual turquoise beads, somewhat suggesting scarabs in gross contours, which have already been described elsewhere (McGregor, 1941: 199 and fig. 67).

A cap, much like a skullcap, but made of beads, was found resting upon the skull. Part of the beads were shell, but part were very small stone beads, many of which had holes too small to permit the passage of the smallest commercial needle, and all of which when strung averaged about 21 to the inch. They were made of a very fine-grained dark gray or nearly black rock. They numbered more than 3600. In the cap they were arranged so that the dark stone and white shell beads alternated (fig. 8).

Near the left wrist were two of the most interesting composite objects found with this burial, the charms of an aboriginal "charm bracelet." They had undoubtedly been supported by a cord bracelet, which was now completely disintegrated. Each is almost an exact copy of the other, and both are very skillfully made. The composite consists of nine pieces, one of which, the nose, is a plastic, and another, forming the back of the head and core of the neck, is a black stone. They are definitely animal heads and very strongly suggest grasshopper heads. One character of the culture to which this individual belongs is the manufacture of extremely lifelike animal forms in small pieces of jewelry; another character is the very skillful, profuse, and exact use of mosaics. Both features are well represented in these samples.

One other interesting object is a circular disk button of lignite. Such buttons are known most abundantly from the San Juan drainage, some being square and some round, though all are expertly made and beautifully finished. This one is a disk with the center of the back raised into a ridge which had been drilled from each side to make suspension by a cord possible. Although this button does not have any inlays or other ornamentation, it is expertly made and exceptionally well finished.

Shell Ornaments

Several kinds of shell ornaments and other shell objects were found. To facilitate discussion, they may be divided into a few simple categories: beads, pendants (other than cut-out work), cut-out objects, inlays, and complete shells, either modified or very slightly modified, as for suspension.

The only shell beads found actually on the man were those which formed a part of the cap. These, several hundred in all, were interspersed with the stone beads in a definite pattern (fig. 8). They are made of the very common marine shell *Dentalium*, of southern California, which is a long tubular needlelike shell. The shells had been broken into small sections and ground down on their ends to make elongated, tubular beads. Almost all were of the six-sided type, *Dentalium neohexagonum*, and some were *Dentalium semipolitum*.[5]

Very few large shell beads may be definitely associated with the burial. Although several were found, they came wholly from screening, or other cleaning work, and in such small quantities that they were probably only a part of the later trash fill of the room. All of the several large beads were of the disk type, with the exception of one tubular bead and two exotic beads, and they varied considerably in size and thickness. The odd beads were oval in outline, flat on the bottom, but rounded on top, and with holes through them laterally. In general form they are almost identical with the two previously mentioned turquoise

[5] Identified by Dr. Howard R. Hill, of the Los Angeles Museum.

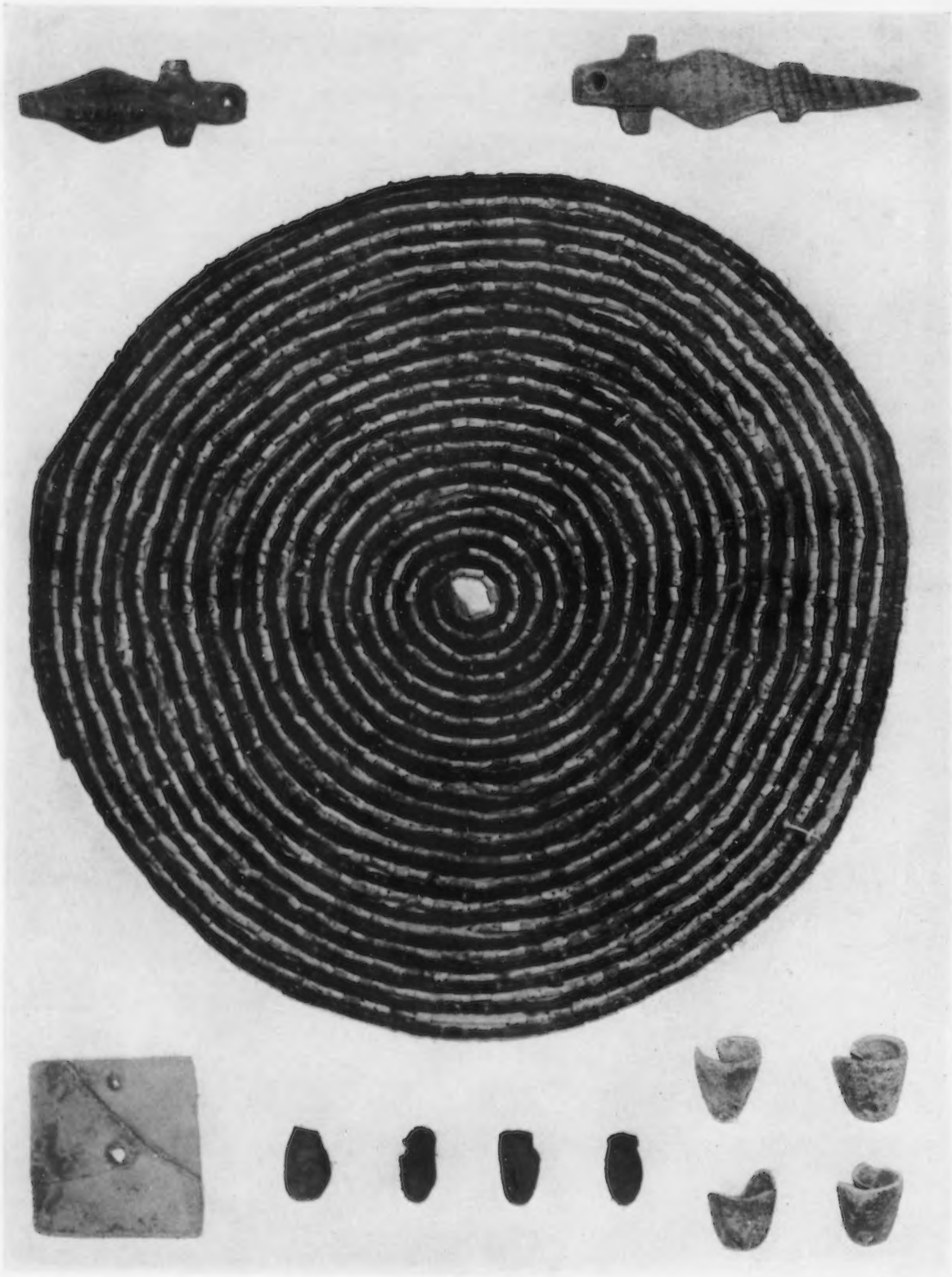


FIG. 7.

(For description, see opposite page.)

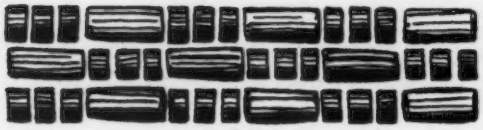


FIG. 8. Detail of construction of the bead cap, greatly enlarged, showing the arrangement of the small black circular stone beads and the tubular shell beads to make a pattern.

beads. One other type of bead, found also in very small quantities, and probably also included in the fallen trash, was the olivella bead, mostly the shorter ground-down type (McGregor, 1941: 219 and fig. 72).

Pendants are of two types, those shaped very simply or only drilled for suspension and those cut out to some unusual form. All of the pendants found were carved, several being cut out inside to form an open pattern. The most interesting are two carved ear pendants which were made in such a way that each had an arm left projecting beyond the circle formed by cutting out the center disk (fig. 9). These are similar to shell fishhook blanks produced in California, and they were quite probably derived directly from that source (Colton, 1941).

Another pair of similar circular shell pendants were found together, and obviously matched. These two were drilled for suspension and had circular holes in the center but no projecting arms. Two pendants, suggesting lizards with long pointed tails, short lateral legs, expanded bodies, and square heads with holes drilled through them for suspension, were found (fig. 7). These seem to have been characteristic and more or less consistent ornaments of this culture (McGregor, 1941, fig. 73C).

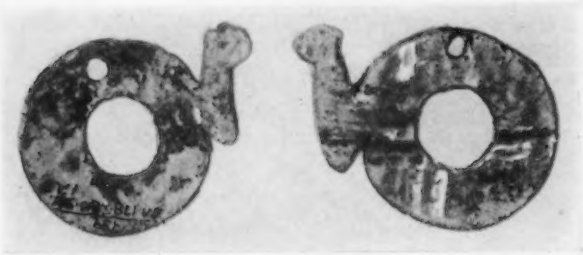


FIG. 9. Two ear pendants of abalone shell made from West Coast fishhook blanks. They represent trade with the California coast.

FIG. 7. Ornaments found with the burial. The two upper objects are pendants shaped like lizards and are a very common trait of this culture. The coiled beads in the center are two strands, of white shell and black stone, which formed the skullcap of the man. At the lower left is a calcite pendant which was painted green. Below the center are four rattles made from trapdoor spider nests. In the lower right are four conus shell tinklers.

The most outstanding and completely cut-out ornaments of this sort were not found with this burial; they came from other sites of the same culture in this same area (McGregor, 1941, fig. 73d). One is obviously a buck deer with horns, within a circle of shell, and is made of abalone shell; the other is some sort of a stocky animal with a plumed tail, also encircled in shell. Both are exceptionally well made, designed, and balanced works of art, and for that reason are once more mentioned here.

One other pendant, composed of both shell and turquoise, should be discussed because of the unusual combination of the two types of material. The main body of the pendant was shaped from shell into a rectangular portion with pointed ends, and was drilled in the center of one edge. A large piece of half-round turquoise was then attached to one side of the shell, with lac, by a sort of riveting process, and forms the most obvious portion of the ornament. In general shape and arrangement the turquoise strongly suggests the ornamental end of one of the complex nose plugs.

Although not truly pendants, in that they were not suspended alone, there were numbers of conus shell tinklers. A short loop of these tinklers was at the right hand in the vicinity of the fingers, as though they were held in the hand of the man. There were two similar short strings extending down the outside of the legs of the individual. It is quite possible that these strings were sewed to leggings, or formed the margin of a kilt, or some covering of the extremities. Fewkes (1898: 535), in discussing material found associated with burials at Chaves Pass Ruin, makes the following observation: "They had rattles of sea shells and wore fringes of shells on the margins of their garments." Thus, in that site of somewhat later date but of almost identical culture, the same custom is indicated as was found at the Ridge Ruin. Each of the tinklers was drilled, with a hole at the smaller end of the spire, to make suspension possible (fig. 7).

Several other fragments of what were obviously pendants were found, and some of them had been carved, but none were complete. Quite likely they were only a part of the trash fill of the room.

Shell inlays were often a part of the mosaics

on plastic ornaments, or were found as scattered fragments throughout the fill, and scattered about the objects. All had been ground with beveled edges. Three other small shell pieces, which might possibly be inlays, were in the form of life-like objects. Two were identical small units with rectangular bodies and two protruding lobes on one end. The other was the head of a snake (McGregor, 1941, fig. 73D). Similar small shell pieces found by Haury at Snaketown have been considered mosaic inlays in that report (Gladwin, Haury, Sayles, and Gladwin, 1937, plate CXIX).

Although no examples of painted shell were actually with this burial, such a shell was presented to the Museum of Northern Arizona by Mr. J. R. Babbitt, of Flagstaff. It was in a burial in company with other offerings which definitely place it as of this culture, and so comparable to the material found with this burial. It is a *Haliotis* which had been only slightly shaped before it was painted. The designs are geometric, in triangles and straight lines with barbs. The colors used are red, blue, green, and a pink or buff color which contrasts with the red. One piece of painted shell was found at Snaketown village (Gladwin, Haury, Sayles, and Gladwin, 1937: 147 and plate CXXIII).

Several specimens of complete shells were found. One cluster of turritellas formed a definite group, and, since they were perforated in the lower margin of the orifice, were probably strung together. There were also five complete *Cardium* shells, three of which were nested together in one group (fig. 10). None had been altered in any perceptible manner, either through use or in preparation for use. Possibly the most interesting single complete shell was an abalone. It has been modified only in that six of the seven holes were filled with a very black plastic material, which appears to be asphalt. The seventh was filled with a reddish plastic, probably lac, and a smoothed notch was cut in one edge of the shell. One large fragment of the rim of another abalone was found, but the main portion of the shell had either been weathered away or the rim had been broken off and only that portion saved. There were also several other fragments of abalone shells which contained prepared pigments, but these gave every appearance of having been only broken fragments.

Bone Objects

Four classes of bone objects were found with the burial or in the associated trash. Perhaps the most interesting are several bone arrowheads; the other three types are a bone tube fragment, spatulas, and a variety of awls. Some of the awls are most extraordinary.

The arrowheads are of particular interest, because they are of the same shape as the predominant stone arrow-point included with the burial (fig. 6). This is the long, narrow point with high lateral notches and a markedly concave base (McGregor, 1941: 187, fig. 64, and table 5). Since they are very thin, they could not have been of use in hunting, so they must have been made for some other purpose, perhaps ceremonial and not practical. On none of the three found were there any indications of attachment or other clues to actual use.

Only one fragment of an exceedingly large bone tube was found. From the arc represented, it would have probably been an inch and a half or more in diameter. The ends have been cut off at right angles to the long axis of the bone and very carefully smoothed and polished. Other similar, though smaller, bone tubes have been reported from this section and culture, as well as from elsewhere in the Southwest (McGregor, 1941: 230 and fig. 75).

Spatulas, or objects of bone which are chisel-shaped on at least one end, were found in some abundance in this burial. They may be divided into three types. The first is a flattened splinter of bone which is spatula-shaped on both ends. There were two of this type. The second type is one in which one end is spatula-shaped, and the other end is pointed so that it could have been used as an awl (McGregor, 1941, fig. 74I). The third type of spatula is one in which the end of the splinter is spatula-shaped, and the other end is rounded though flattened. All are well finished by grinding and polishing.

It should probably be mentioned that, in all these spatulas, the more or less squared and flattened end which is spatula-shaped is not ground down to a sharp edge, but it is left slightly thick and blunted. The use to which such objects might have been put remains highly problematical.

The most abundant and varied objects of bone were, of course, awls. They could readily be divided into general types: those made from splinters of bone, and several varieties of awls made of bones in which the head was split but was only slightly modified or not modified at all.

Only one of the splinter type of bone awls was found with this burial. It was a small, irregu-

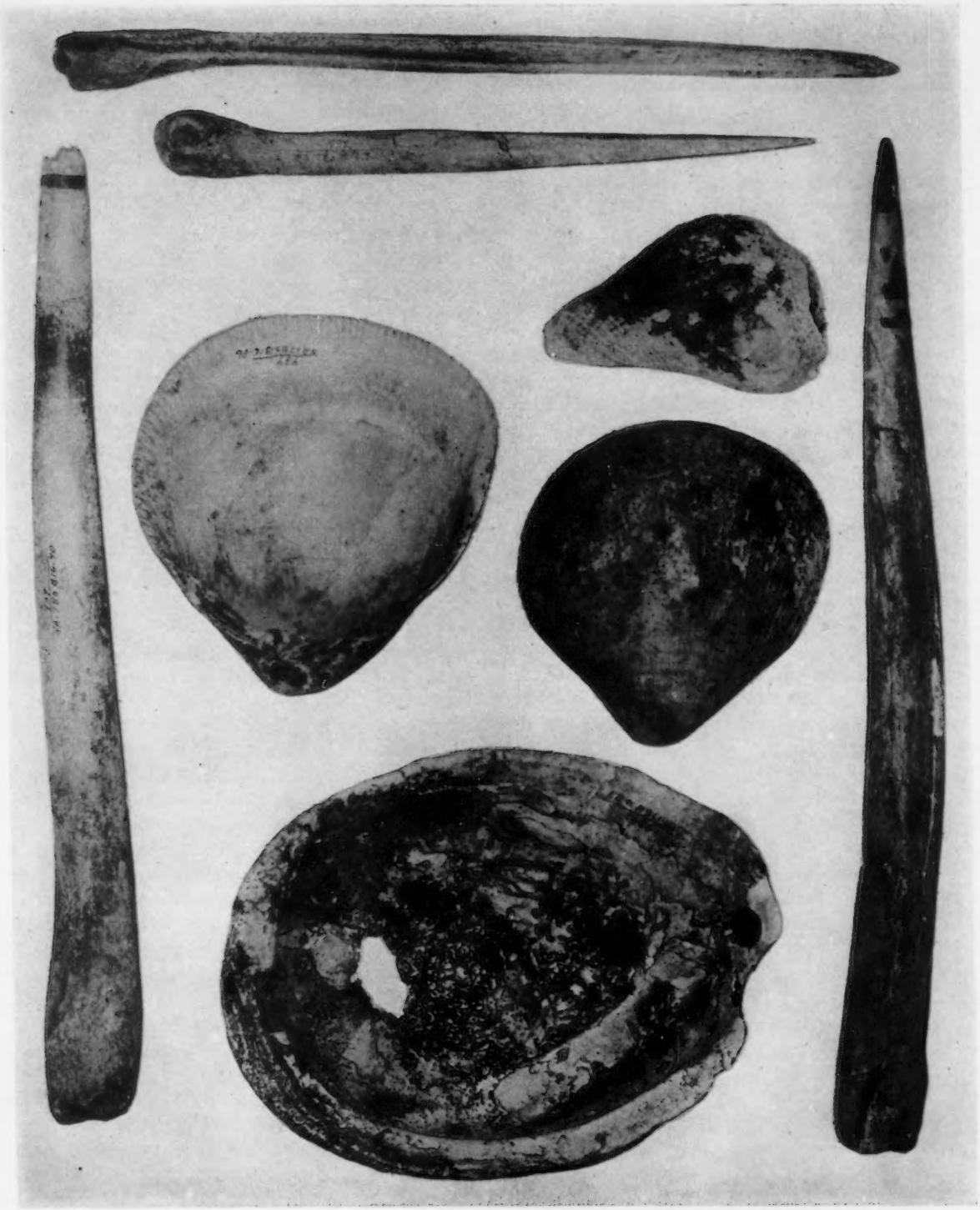


FIG. 10. Some of the bone awls and whole shells found with the burial. The two awls, one on each side, still show some mosaic ornamentation near the points and are made of very large bones. The smaller awls above are split metatarsals. The upper right shell was an ornament on a stick, the others were apparently used as containers. Note particularly the well-preserved abalone shell at the bottom.

larly shaped fragment, sharpened at only one end (McGregor, 1941, fig. 74H).

The split-head type of awl was by far the most common. In all cases the head of the bone had been ground down somewhat to smooth this portion (fig. 10). Two large awls had holes drilled through the ground-down end, as though for suspension (McGregor, 1941, fig. 74C). In one case the head had been ground on the edges, as well as both faces or sides. This form of awl may be considered a distinctive type of the Winona and Ridge Ruin sections in so far as it is known.

Of interest are two large bone awls decorated on the pointed end with a combination of plastic, probably lac, and what appears to have once been shell mosaics (fig. 10). The shell has now disappeared except for a trace of lime, but the lac or plastic is still about as applied. Obviously such awls as these could never have been primarily utilitarian; therefore, they must have been ceremonial rather than practical.

The types of bones used to make the awls are interesting. Three of the awls were of such large bones that they could not possibly have been from even the largest buck deer; they must have been made from the bones of a small elk or of some other animal of comparable size. Unfortunately, the heads of the bones have been so altered that absolute identification is now impossible. Of the smaller bones, those made from splinters are also impossible to identify, though they are all sufficiently small to have been either deer or antelope. Even a few of those examples, in which the head was only partially ground down, were not identifiable. Of the others, in which the head is more or less intact, both antelope and deer bones are represented.

Wood Objects

Wood objects found with this burial may be divided into several classes. These are: fragments of small bows (which were painted in colors), a number of arrows or parts of a screen made up of individual rods painted in bands, carved and ornamented sticks of various sorts, a wood cup (which was also painted), a hardwood arrow foreshaft, and one example of a wood back to a plastic mosaic.

The first objects found in uncovering the burial were fragments of the small painted bows. They were, in their thickest portions, only about 1.3 cm. in diameter, and, although all were broken, they were in every identifiable case tapered to the ends and slightly bowed. Fragments of a good many were found as though they were placed in the upper layers of the grave material in a considerable mass. Although they are in most cases very fragmentary, and in no case was one sufficiently preserved to make determination of the complete design possible, several colors were used. Blue, blue-green, and red, which tends to pink or terra cotta, are easily identifiable.

In two of the largest fragments of the bows, a portion of the design could be made out. It consists in both examples of a series of parallel, chevron-like lines bordered by bands. These are almost exactly like designs found on bows in the upper Gila region and also like painted sticks and flutes reported there (Hough, 1914: 97–102, and figs. 339–348). The colors on the upper Gila specimens, red, green, black, and yellow, are similar to the colors on the bows found near Flagstaff. In fact, the apparent identity of the objects from these two regions is most amazing.

Scattered throughout the upper portion of the burial material, but below the zone which contained the miniature bows, a considerable number of painted reeds were found. These were, on the whole, badly decomposed; thus their original shape and use could not be definitely determined. Quite probably they were arrow shafts, although they might also have been a series of reeds joined together as a screen. In many cases the reeds were found placed side by side in the ground. They had been tied at intervals with threads or light cord, as though they were joined together to form a screen, for, though the threads are gone, the marks they made on the shaft are still visible.

The colors used in the decoration of the reeds are green, white, red or orange-red, blue, yellow, ground-up specular iron, and, of course, the natural color of the shaft. This gave a considerable variety to the decoration and led to the original supposition that they were a mat or a screen of some sort and not arrows. However, since the color bands extend completely around the shafts, if they formed a screen, they must have been painted before they were tied together. Modern Hopi and Navajo ceremonial screens with which the writer is familiar are not constructed in this manner, by wrapping around the reed, but they are made by drilling through sticks or reeds and binding them together with a cord through the holes.

Upon more mature examination, the case for their having been arrows is much better. The

PLATE III

1 2 3 4 5

CARVED HEADS OF FOUR OF THE CEREMONIAL STICKS

FIG. 1. A hand of intermediate size, not painted.

FIGS. 2 and 3. Two views of a deer or antelope foot—the largest carved foot found. Only a portion of the shaft is shown, though it was complete.

FIG. 4. The largest carved hand found.

FIG. 5. An ornament badly disintegrated, but probably also attached to a stick.

colors in bands go completely around the shafts, covering the tying or wrapped zones in some cases. Thus the wrapping was done on the reeds before they were painted, which in turn could not have been done if they were already tied together in a screen. The wrapped or tied zones also suggest the wrapping and tying of the vanes of arrows. This is further substantiated by the discovery of what appear to have been the vanes of feathers on one of the examples found, which was impressed diagonally on the shaft. Since it is the butt end of the arrow that is painted for identification, and which also has the vane to assist in flight, those parts found do seem to suggest arrows.

The elaborate ornamentation and the profuse use of colors, especially the use of the specular iron as a decorative pigment, would appear to be much too involved for use on ordinary arrows, but it might be the sort of thing used on a screen, particularly a ceremonial screen. The abundance of beautifully chipped arrow points found scattered about this same zone may be the answer to the entire problem, for, if these are not arrow shafts, then, with the exception of one hardwood foreshaft, there is no evidence that the points were hafted. Hough (1914: 101) has described short ceremonial arrows which were used with the ceremonial bows of such groups as the Zuñi Indians. From all this, and though they are in every case exceedingly fragmentary, the writer is inclined to class these ornately decorated reeds as arrow shafts, perhaps ceremonial ones.

Several carved sticks were found in various positions in relation to the body, as illustrated in figure 3. All were made of some dark, dense wood; the weight of the material, the grain, and the color suggest mountain mahogany or some similar type. In all, twelve worked sticks, pointed on one end and ornamented on the other, were found. Three of these are carved in the form of deer feet, and two are carved into hands. (For illustration, see pl. III, figs. 1, 2, 3, 4.) One hand was found not on a stick, and one stick was found with plastic on one end but with no associated ornament. As there was also plastic on the wrist end of the hand, it may be assumed that it was originally placed on a stick. Six additional sticks were found, but they were so badly weathered that they could be identified only as tapered and artificially rounded sticks. None of these had carved or other ornamented heads attached (McGregor, 1941: 253 and fig. 78P).

In carefully checking and reëxamining all of these carved sticks, it was noted that there were three of varying sizes with deer feet. The larger foot was painted green, but the intermediate size and the small one were not. This made a set of three of graded sizes. Next it was recalled that the largest hand, which was not found attached to a stick, was also painted green with a red trim, and that there were two other sticks with carved hands, one intermediate and one of small size. This made a comparable set of three sticks, like the feet but of hands; the largest was painted green and the other two were not. Two crescent-shaped or double-horn mosaic headpieces were also originally on sticks, but a search for a third such ornament was not rewarded with success. The total sticks found, both with and without heads, were then counted, and it was learned that there were twelve.

From this, it would appear that there were four sets of three sticks each. One of these sets was made with deer or antelope feet carved on one end. Another set had human hands carved on one end. A third set probably had mosaic horn-shaped heads attached to the sticks. A fourth set, though represented by the sticks, was not found with the heads attached. One extremely fragile, almost completely disintegrated, carved and painted wood ornament may actually be the type of object which was originally on these latter sticks. It was made of light wood, perhaps cottonwood root, in the form of a flat and elongated wedge with serrations on the edges. It was painted green, with the exception of two bands of red down the sides. For illustration see plate III, figure 5. As it was extremely fragile, only small fragments could be preserved, but careful observation and field measurements made the color drawing possible.

The shaft of each of the sticks had been carefully rounded and tapered to a fairly sharp point. The other end was either carved directly from the original mass or was built up by having the carved or modeled portion added to the end. The deer (or perhaps antelope) hooves were very carefully made, showing such features as dewclaws, separate toes, and other similar details (pl. III, figs. 2, 3). All of the hands are open and the fingers spread, as in the illustration. Slight curvature of the back of the hand and the hollow of the palm is indicated, but the fingers, though curved, are tapered directly. The outline of the individual fingers is somewhat exaggerated on the back of the hand.

Outstanding among all these sticks is one which was decorated with a complex modeled double-horn-like base covered with turquoise (pl. II, fig. 5). It was undoubtedly the most elaborate and most carefully made of any, but, at best, it must have been an exceedingly fragile ornamental object. As it and another similar mosaic piece are to be discussed immediately following, no more need be mentioned concerning it here.

None of the sticks are especially large, and, in fact, some similar sticks reported from other sites are quite small. For a comparison of the various sizes, see table 5.

One carved and painted wood cup, though badly disintegrated, was sufficiently preserved so that a complete reconstruction drawing was possible (pl. I, fig. 2). Measurements were not exact, but it was possible to suggest the approximate size. It was carefully made with thin walls and a thin base. Cottonwood root was used. This is the same material from which the Hopi Indians still carve kachina dolls, a most interesting long-time parallel in similar materials and methods of carving. The colors employed in the decoration of the cup are red and a blue-green, the red being used as a base coloring for the carved features, and the green was applied to it as a design.

Another wood object is of particular interest. It is a flat disk which was used as a back for the support of a plastic mosaic. Unfortunately, it is poorly preserved, except where it came in contact with the lac, and cannot be further characterized. None of the plastic mosaic objects had such a wood backing.

An arrow foreshaft was also found. Though one portion appears to have been carved with a shoulder, it is now rotted to such an extent that this is not certain. The larger, forward end is slotted so that the arrowhead could be inserted, and it is bluntly pointed. The other end has a long taper to a sharp point. It is interesting, for it alone was found with the very great number of stone arrow-points. Perhaps the majority of these points were either not hafted or were not set into hardwood foreshafts that might have been preserved.

Mosaics

Probably the most outstanding craftsmanship found with this burial is that represented by several mosaic pieces. Some, particularly those in which turquoise was used, are so outstanding that they are almost unbelievable. In fact, they seem to be equaled only by some of the fine mosaic work from Middle America. The turquoise mosaic work on the basket or arm band has already been discussed, but the fact that each turquoise was carefully cut and fitted to place should be mentioned again. It is this sort of exacting craftsmanship that characterizes all such work found with this burial.

Apparently the most characteristic mosaic pieces were those which were made and mounted on modeled lac or some other plastic material. The

TABLE 5

TYPES OF OBJECTS MADE OF WOOD, WITH NATURE OF ORNAMENT, DECORATION, AND MEASUREMENTS

Type	Ornament	Decoration	Length in cm.	Diameter in cm.
Stick	double horn	turquoise and shell mosaic	40	1.9
Stick	large hand 11.5 cm. long	red and green paint	48.3	1.6
Stick	medium hand 5.4 cm. long	no paint	45.7	1.9
Stick	small hand 3.8 cm. long	no paint	not complete 31.8	1.3
Stick	large hoof 6.1 cm. long	blue and green paint	not complete 26.4	1.9
Stick	medium hoof 4.5 cm. long	no paint	34.3	1.6
Stick	small hoof 2.5 cm. long	no paint	31.8	1.3
Stick	none present	none present	not complete 38	1.9
Stick	none present	none present	not complete 42.5	1.6
Stick	none present	none present	42.2	1.9
Stick	none present	none present	43.2	1.9
Stick	broken fragments	none		1.9
Arrow foreshaft	none	none	15.2	.7
Cup	none	red and blue-green	10.2	8.9

TABLE 6

CHARACTER, MEASUREMENTS, AND MATERIAL OF SEVERAL OF THE MOST INTERESTING COMPOSITE ORNAMENTS

Ornament shape	Approximate mosaic sizes	Width in mm.	Height in mm.	Material	Support
Ear shape	1×2 mm.	38	54	lac	no data
Circular	1×1 mm.	54		lac	wood disk
Bird shape	1 mm.±	70	40	lac	no data
Bird shape	2 mm.	70	42	lac	on bracelet
Circular	large	23		lac	on black stone
Long oval	large	13	64	lac	wood back
Double horns	Variable 5×4 mm. to 2.5 ×2 mm.	92	48	plastic not lac	on a stick
Double horns	large triangular shell	150	51	plastic not lac	probably on a stick

first such piece to be characterized here was shaped roughly like a human ear which had been severed from the head. The straight inner side was thin, while the curved outer edge was much thicker. Only sixteen turquoise mosaics are now adhering to the thick edge of the plastic, although impressions indicate that they once covered the entire lower "lobe" portion. Though some of the remaining turquoise pieces are rather small, the average was larger. Unfortunately, it now appears to have been warped from its original shape; so, unless it did once represent an ear, the form or the use cannot now be determined. This is the least well made of the several turquoise mosaics found. See table 6.

Probably the best-made mosaic is a round medallionlike object (pl. II, fig. 3), the original diameter of which was slightly over 51 mm. The plastic was built up against a wood disk, also circular, as indicated by the structure shown on the back, though no wood remains. In this piece, many of the mosaic fragments have been lost, and the disk is warped and somewhat irregular, but enough is left so that the general pattern and form may be determined with considerable accuracy, and the reconstruction drawing is felt to be authentic. All mosaic pieces were cut to fit accurately so that almost none of the plastic could be visible on the surface. Both shell and turquoise were used, in a simple, circular pattern. All of the individual turquoise mosaic pieces are quite small; some are absolutely microscopic. It is a remarkably well-made ornament, but the pattern is not unusually pleasing.

Another very well made ornament is illustrated in plate II, figure 1. It is modeled in the form of a bird with outstretched wings. The center portion undoubtedly consisted originally of a cut-out or shaped shell piece, with a border of plastic, upon which were set a series of minute turquoise mosaics. Though all traces of the actual shell are now gone, the impression it originally filled is still quite distinct. This is very similar to a bird-shaped ornament found at Casa Grande in southern Arizona. All of the individual turquoise mosaic pieces forming the rim of the object are exceptionally small; several of them are less than 1 mm. in one measurement, and all of them are only slightly larger than 1 mm. in any measurement.

A somewhat similarly modeled, pure lac bird is even more interesting, for it was found attached to a broken shell bracelet (pl. II, figs. 7–8). The bracelet had been prepared to receive the lac by grinding through the beak of the bivalve, to form a hole, and then by grinding down the rest of the shell, leaving this perforated beak portion as an oval. Some of the lac was then forced into and partly through the hole, like a rivet, to hold the ornament to the bracelet. Other fragments of similarly shaped bracelets were found, but their significance was not realized until this particular one was studied. Because of this find, it had previously been suggested that some small *Glycymeris* shells were ground through on one side to receive a mosaic held in place with lac (McGregor, 1941: 221 and fig. 67K). The turquoise pieces making up the mosaic, though they are as carefully shaped and fitted as the previously described pieces, are on the whole larger. Fragments of shell were used in a peculiar angular arrangement, as indicated in the illustration. Of special interest is the large, more or less globular head of the bird, into which were set, as inlays, at least three pieces of iron pyrite.

Several other relatively small and more simple objects embodied what appears to have been pure lac, both as an adhesive and as a modeling agent.

One of these is a small button-shaped object previously described.

Another broochlike ornament, which was in the form of a long oval, was of lac on a wood base. The lac was used to attach the central shell portion and the six turquoise mosaics to the wood. All are shaped and well fitted, but it is not so elaborate as other similar mosaics. Because the shell is gone and the wood backing is disintegrating, only a general idea of the original form may be had.

Two other objects are of extreme interest. They are two double-horn-shaped objects made for heads for the pointed wood sticks already described. One was covered with carefully cut and fitted turquoise mosaics, while the other was decorated with triangular shell fragments and red and blue paint. The first one was found with the stick upon which it was attached (pl. II, fig. 5). The horn, as well as the mosaic-incrusted button head in the middle, are modeled of a light plastic material and are hollow throughout. Excellent turquoise, well cut and fitted, forms the main body of the object, but a shell button was originally attached to the end of each arm, and triangular shell inlays were set into the top and base of the knob. As will be pointed out later, this ornament was fastened to the stick with a pin which extended down into the stick and up into the head.

The second object was not found directly associated with a stick, but it was so similar that it must have been used in the same way. It was made of a plastic so like the one just described, in texture and general appearance, that it may be considered the same, but it was not analyzed. The arms of this ornament are also hollow. It was modeled in three parts, the two arms and the central ball, and later stuck together. Triangular bits of shell inlay were set into the horns and the ball, thus forming a design as indicated in plate II, figures 6 and 9. Between these triangular shell inlays, on both the ball and the crescent-shaped lower portion, the plastic was painted blue. The ends of the horn-shaped arms were capped with shell buttons similar in shape to the larger turquoise buttons used on the ends of the nose plug. On the upper and lower surface of each horn-shaped arm, and filling the space left between the two lines or triangular shell inlays, there is a wide line of bright red paint. At intervals this is crossed by fine white lines. Certainly this was a most impressively colorful head to one of the sticks, and, although the head described above, made completely of turquoise mosaic, surpassed it in craftsmanship, this was probably originally the more colorful of the two.

Minerals

Quite a large collection of minerals was found with the burial; in fact, both diffuse minerals and crystals were utilized in various sorts of ornamentation. Several small fragments or partly shaped balls of pure kaolin probably came from somewhere in the Painted Desert region of the northern part of the state. One large ball of yellow ochre was also found, but this is relatively widespread and occurs in many deposits. There were also several irregular pieces of hematite of varying compositions and textures. It is not the kind of red paint which the Hopi Indians secure from the Havasupai Indians today, but it is of a type which Hopi informants suggest might have come from the Red Butte south of the Grand Canyon.

There were two large masses of copper ore. One consisted of broken fragments of green-colored malachite (copper carbonate), aggregating several pounds. It was probably the proximity of this mineral to various fragile objects that helped to preserve them. Azurite of an exceedingly beautiful blue color (also copper carbonate) was found stored in reeds and in gourds. It had been carefully prepared by being ground and sorted before it was placed in the containers. A bundle of 20 of these filled reed tubes, making a bunch 6 inches in diameter and about 10 inches in length, was found in one place. Two gourd containers filled with the same material were found in another. Both of these beautiful pigments undoubtedly came from the Verde Valley.

Of the crystals, most were either unmodified or very slightly modified. Several quartz crystals were found, but these had not been modified and may possibly have served as part of a ceremonial kit.

Probably the most interesting pigments were a series of cinnabar-filled sacks, which were found in two locations. Only the tops of the small skin bags, where they had been tied with sinew, were left, but quantities of the tiny cinnabar crystals, which they once contained, indicate their total capacity. Eight or more bags filled with raw cinnabar crystals were originally placed in the burial. Several balls and irregular masses of prepared red cinnabar were also found. In this case the crystals had been finely ground and mixed with clay or

some other material to form the pigment. This is the red paint which was used to make the red and brown designs on the painted baskets and the modeled ornaments. The possible source of the cinnabar is of considerable interest, for the padres and early Spaniards were attempting to find such mines in northern Arizona. In so far as the writer is now aware, there are no sources of this material here, but it does occur in the mountain section of Arizona in the Mazatzal Mountains west of Roosevelt, near Prescott, and throughout southern Arizona, and it also occurs in some abundance from Santa Barbara north in the coast ranges of California and in northern Nevada (Galbraith, 1941: 17).

Two other interesting crystals were used more or less directly. The first of these is apparently specular iron, which has already been mentioned as having been used as a means of decoration on the painted reeds. A skin sack full of this bright material was found. It was mixed with some adhesive agent and is a more or less solid mass, now preserved in the form of the sack, although the skin is completely gone. As this mass of finely ground crystals is attached to the end of a stick which protruded from the mouth of the sack, it is probable that they were originally bound together with some plastic, such as lac. In fact, it has already been suggested that lac was used as a binder to attach the crystals to the reeds. Iron pyrite crystals were also used to form the eyes of the bird-shaped objects modeled of lac. These crystals could have been secured locally, although they are not commonly known here, but they more likely came from the Verde Valley, to the south, or from as far away as northern Mexico (Galbraith, 1941). Specular iron, on the other hand, is relatively abundant over a wide area.

Odd Objects

Several other objects, which do not readily fall into any of the classes already described, still remain to be discussed. One of the most interesting is a large series of spider nests and perhaps some cocoons, which were used as rattles (fig. 7). The nests are those of trapdoor spiders, with the lids still attached and containing a tiny pebble which rattles when they are shaken. Each is perforated through both sides, just below the door, so that they can be suspended on a light cord. They are very suggestive indeed of Papago cocoon rattles observed by the writer in use in ceremonial dances. Enough rattles were found to make a good-sized string several inches long. Though some were, of course, fragmentary, more than seventy may be accounted for in this group. Possibly they were tied around the ankles or lower limbs in dancing.

Two other small stone objects should be mentioned. One is a rectangular block of volcanic tuff. It is of coarse, exceedingly light, and easily carved material. Down one side, near the middle of its length, there is a narrow groove extending from one face to the other. On the upper surface this groove was extended toward the center of the face to meet a more or less conical depression. In every respect it suggests the base block of a fire-making apparatus, but such things are usualy made of wood, not stone. It is possible that this soft and porous rock would shred the fibers of the stick and make friction even better than the usual wood base. There is, however, no indication of charring. See table 7.

TABLE 7

CHARACTER AND SIZE OF ODD OBJECTS

Object	Material	Length in mm.	Width in mm.	Thickness in mm.
Rectangular block	tufa	38	19	16
Round rod	calcite	64	7	

The other stone object is a piece of carefully shaped calcite, which was smoothed and polished all over. It is rod-shaped and somewhat pointed toward the ends. Several other odd-shaped pebbles, and even a few concretions, were also found, but, since they are more or less characterless and certainly defy identification as regards use, they will not be described in detail. Although they were not found together, but scattered through and among other things, they do suggest objects found in medicine kits or bags.

A set of what appears to have been ornaments was made by painting and drilling the claws and canine teeth of a mountain lion. Two sets of four claws were prepared by removing and cleaning away the tissue and then painting green. These could have been suspended by the base of the claw. The two canine teeth were of an adult individual of medium to large size. Concerning them E. Raymond Hall says (in *litt.*, December 9, 1940):

> We have, to our satisfaction, identified the claws and two canine teeth referred to in your letter. . . . They prove to be from the mountain lion (*Felis con-*

color). I noticed that one had been drilled for use as an ornament of some kind. I can imagine that it was a remarkable feat for an American Indian to have killed the Mountain Lion with the relatively crude weapons available.

Unusual Techniques

Lac and its uses

In the course of laboratory examination of all this material, several masses and lumps of what appeared to be organic matter were noted. These were later referred to Dr. Volney Jones of the Ethnobotanical Laboratory, University of Michigan, for examination and comment. His decision concerning them proved to be most startling, for they were lac, the exudation of the lac insect—the basis of such materials as shellac and sealing wax. As this was the first evidence of such material being used prehistorically in America, a further careful search was made through this and other collections for additional samples of lac as a modeling and binding material.

The first identified lac consisted of the raw lac as gathered from the plant and also as a lump attached to a stick. Later, objects modeled of the lac were noted, both as pure lac and as a mixture with some other material. It was also used as an adhesive in such operations as fastening arrowheads to foreshafts and attaching mosaic fragments to bases.

The hosts which lac insects of the Southwest inhabit are the creosote bush, *Larrea mexicana*, and the shrub *Coursetia glandulosa*. Both the hosts, and therefore the insects, are confined to the desert portions of the Southwest; thus the lac was traded to northern Arizona and was not derived locally. Concerning the matter of distribution, Volney Jones writes (in *litt.*, March 1, 1940): "This produce would not be available on the Plateau proper, but it could be obtained in the deeper canyons and river valleys where tongues of lower Sonoran flora dissect the Plateau." Such a river valley is the upper portion of the Verde Valley, and a considerable search has been made there in an effort to locate lac, but it has been unsuccessful. Extensive, though not particularly intensive, search has been made in other sections with the result that individual infected plants have been found over a wide area, but no real supply, except in certain restricted localities, is known. One such area of relatively abundant infected plants was found just north of Phoenix, in a canyon west of Camelback Mountain, and another was found some 6 or 7 miles west of Kingman, in northern Arizona.[6] Of the two, the Phoenix area is the closest and is on an established trade route which existed at that time. It is quite possibly the source of the lac found here.

Organic Material Other than Lac

Besides lac, another material which might be considered under the heading of techniques is an organic plastic of unknown composition. So far as is now known, this was only used in connection with basketry, but it might equally well have been employed for other things. It was used in two similar, though slightly different, manners, as a leveling and adhesive material for the attachment of turquoise and other mosaics to the basketry and as a leveling agent to smooth the surface of the basket in preparation for painting (fig. 5).

Woodworking

One other technique as regards the woodworking shown in the carved sticks is of sufficient interest to warrant further comment. By careful examination it was found that the stick with the turquoise mosaic head had a wood projection in the large end. This was a pointed pin which was set into a hollow in the end of the stick with lac. As the pin was pointed on the upper end, and probably also pointed on the lower, it seems to be the answer to the question of how the hands and other carved objects were attached to the sticks. The method is almost exactly that of our own use of a dowel pin set in glue. Hopi workmen today, in the manufacture of such wood objects as kachinas, use the same technique for fastening two pieces together.

Conclusion

Restoration of the Man

In summarizing and evaluating the material which has just been discussed, a reconstruction of the individual as he appeared in real life may be attempted. Determination of the physical type seems to shed some light on the several problems raised early in the work of excavating this burial and also on those mentioned at the beginning of this report (fig. 11).

Probably the most immediately noticeable character of the head was the marked posterior defor-

[6] Survey made by Dr. H. S. Colton, Museum of Northern Arizona, assisted by the staff members.

FIG. 11. Restoration of the head of the man modeled on the skull, showing his approximate appearance in life, with his cap, nose plug, and ear pendants in place. Most striking features are the long, narrow nose, accentuated by the use of the nose plug, the long, flat face, and the skull flattened in the back. Modeled by Virgil Hubert.

mation (McGregor, 1941; Bartlett, 1939: 300–305). The back of the skull, as found, was extremely flattened, so much, in fact, that it was submitted for examination and comment to Dr. W. M. Krogman, of the Department of Anthropology, University of Chicago. His summary observations follow:

> I would conclude, therefore, that the occipital flatness has arisen from two causes: first, from a cradle board, and second, through post-mortem distortion. I would reaffirm my position that the first cause would account for about twenty-five percent, and the second cause would account for about seventy-five percent of the condition at present observed.

Such deformation of the back of the skull is typical of Pueblo Indians, though, even with only one-fourth of the present flattening due to a cradle board, this skull was probably more flattened than the average.

The next most prominent character was undoubtedly the long, slender nose, long for any American Indian and markedly so for any Southwestern Indian. The root of the nose was narrow as well, and the bridge was high, so that with the addition of a nose plug the impression of an exceedingly long nose was inescapable in life.

To match the narrow nose, the face was rather long, a feature which was accentuated by the fact that the cheek bones, the malars, were not prominent but were unusually flat. In fact, in this respect, the face suggests some European types. However, the lips protruded, as a result of alveolar prognathism. This feature is not lacking in many Indian crania. The last marked facial character was a broad, rather heavy, square jaw. The angle where the body meets the ascending arm directly below the ear was very square. This feature is found in many Indian men today.

From a consideration of the man in general, it has been estimated that he was about 35 or 40 years old at the time of his death. From careful measurements of the long bones, it has been possible to determine that he was of more than average height, about 5 feet 8 inches. Other adult males from the same area and culture, which have been computed, varied from 5 feet to 5 feet 6 inches. The only other feature of interest was that his right radius had been fractured and had later knitted. Physically he was probably different to a noticeable extent from his fellow men, but he did not show any radical departure from the general type. Figure 11 shows a restoration of the man modeled from the skull.

Dress

At the time he was buried he was dressed, at least in part, in his best jewelry and clothing, some of which was certainly ceremonial. On his head was a cap, like a skullcap, made of beads of both shell and stone, which covered the entire top of his head to about the upper tip of his ears (figs. 7, 8). If the descriptions of similar caps worn by Hopi Indians, within the memory of living men, may be relied upon, the center of the top should have had a raised point into which was set a red feather or feathers (fig. 11). It is an interesting fact that a single brilliant red feather was found in a basket of elaborately painted design in another site of the same culture in this immediate area.

Two pendants of turquoise, which were disk-shaped and onto which two smaller disks of shell were stuck with lac, were in his ears (pl. II, fig. 2). He wore a nose plug of exceptional size and unusual workmanship. It consisted of a curved central portion of red argillite to which two half-round buttons of pure bright blue turquoise were stuck with wedges of lac (pl. II, fig. 4). Surprisingly enough, no indication of a necklace or pendant hung from the neck was found with this burial. About his right wrist was a bracelet of exceptionally pure, bright blue turquoise disk beads, while suspended from his left wrist, probably by a cord, were the two compound animal heads made of black stone, turquoise, and lac. In the right hand he apparently held a string of conus shell tinklers. Unfortunately, there is no absolute proof of clothing of any kind, for it was all too fragile to have been preserved. He must, however, have had on at least some sort of kilt or leggings, for down each leg, along the outside of the limb, was a string of conus shell tinklers. Two bands were also found, one encircling each knee (fig. 3). Before interment, the body was either placed between two woven mats or was wrapped in one very large one.

Burial Objects

With or about the man were all of the various objects for which he might have had any use in a subsequent existence. Many were jewelry pieces, but others were purely utilitarian. Some of the jewelry is of exceptional workmanship, and a few pieces show a technique of modeling in lac which has not heretofore been noted in prehistoric America. Several pendants, some of cut-out shell, oth-

ers of stone, and brooches of lac and stone mosaics were found scattered about or in bowls or baskets. Ceremonal paraphernalia were also placed near the man; in several cases they were resting directly on his body (fig. 3). These were such things as carved, painted, and inlayed sticks, awls, small bows, arrows, and other objects. Of a more useful nature were the abundant baskets, several shells which were used as containers, and many pottery vessels.

Several of the baskets were truly remarkable, for they are definitely of a technique not previously described. They were leveled over the entire surface inside and out with a filler material; then they were painted over this surface in a variety of unusual colors (fig. 5). This resulted in a most remarkably pleasing effect. One basket, apparently open at both ends, so perhaps an arm band, was completely covered on the outer surface with a mosaic composed of more than 1500 cut and fitted turquoise fragments, shaped and fitted rodent teeth, and black and red stones (see pl. I, fig. 1). Although other somewhat similar objects have been found in the Southwest, this is unquestionably the best known example of work of this sort.

The shells are interesting, largely because they indicate trade from the coast. Unfortunately, no particularly informative techniques are demonstrated in the shells, although the holes in one abalone shell had been filled with what looks like pitch, except for one. From this the filling had evidently come loose, been lost, and then replaced with lac.

Neither are any of the pots of exceptional design or workmanship but, because of the quantity and variety of types, they are impressive. Twenty-five complete pots were found with the burial, which is certainly most unusual and gives indisputable evidence of types which were in use at one time and place, a fact which is of extreme importance in determining cultural relationships. Several pieces of pottery contained what appears to be the remnants of some sort of food, perhaps corn meal. In one there was a small quantity of raw lac, as collected. In another there was a mass of hair that appears to be that of bear or some other coarse, straight hair. In a third there were rinds of gourd or squash. In still another there were some very minute black seeds, while in the last there was a quantity of twisted fibrous material, perhaps a hank of yarn, and a mass of badly disintegrated vegetable matter, which shows structure but cannot be definitely identified. All this obviously formed a reserve supply of food and materials to be taken to some other life.

It is uncertain in just what category the arrow points and painted reeds should be placed. They are so numerous that they might have been put in the open grave as a sort of offering to the spirit of the man. It is, of course, possible that they, and the large knife blades, might have been actually used in hunting and other operations; therefore, they were probably included with the body for the same purpose as the food, bowls, and ornaments.

Interpretation

From the evidence at hand, it is possible to make certain definite interpretations concerning the actual status of the man himself. Of primary interest is, of course, his ceremonial status, for the paraphernalia with him obviously represent some ceremony. Hopi Indian informants were shown portions of the material recovered from this burial soon after it was taken from the ground, and before any particular interpretation was undertaken, to see what reaction they would have toward it. All of them agreed without hesitation that many of the objects were definitely ceremonial. After some discussion, each in turn further decided that they could definitely identify the ceremony represented by the objects. Questioned individually, they all agreed that it was the same ceremony, although they often called it by different names. This latter fact is not necessarily conflicting, for each mesa, and often each village, has a slightly different name, even a different formula, for the same ceremony.

Most impressive was the fact that when an informant was shown only part of the objects, he often described, sometimes quite accurately, other things that should have been found with them. This was the case of a Shungopovi man who indicated that there should have been a clublike object with serrated edges, a double-horn-like object, and a cap with a point on the top, when certain of the sticks were shown to him. These were later produced, much to his gratification. He further suggested that the fraternity was made up of individuals drawn from the Spider and Bluebird clans.

Edmund Nequatewa, a Mishongnovi man, said that the man and the ceremony might be called "Moochiwimi" or "Nasot wimi," meaning to swallow sticks. He felt that members were

largely chosen from the Skeleton and Coyote clans, though as time went on those making up the group might have been chosen from new or different clans in order to perpetuate the ceremony. He has described the paraphernalia in detail and says that the last time this ceremony was performed was about 50 years ago, or perhaps slightly later. All informants have agreed that it was a sort of witchcraft, practiced for the strengthening of the individual or the group, so the war leader in a foray was often chosen from this group. For the same reasons they were represented by strong animals, such as the bear and the lion.

A set of eight mountain lion claws and two canine teeth, which had been painted and drilled, were found with the man. Hopi Indians, when asked about these animals, not only insisted that the bear and mountain lion were animals of strength and power, but with equal insistence they maintained that men belonging to this witchcraft group could change themselves into the animals they considered themselves associated with. They could also call upon these animals for aid; in fact, they are supposed to have even had songs which, whenever sung, would call up the animals. This idea is very similar to the guardian spirit concept and might have been physically represented by such objects as these claws and teeth.

Jim Kewanwytewa, of Oraibi, says that the man could be called "Ka-leh-ta-ka" or the leader, since he was the leader on the warpath or in other activities. He, too, has described the objects used by participants in this ceremony, and he has characterized the ceremony as a sort of witchcraft in which sleight-of-hand was undertaken. Like all the other Hopi informants, he has agreed that the use to which the carved sticks were put was similar to the sword in a sword-swallowing act. The pointed end of the stick was forced down the throat so that just the ornamented end projected from the mouth.

Possibly the most interesting observation of any informant was that made by the man from Shungopovi, when he voluntarily asked if the find was not located somewhere near Canyon Diablo. When he was assured that it was from a small pueblo only some 18 or 20 miles west of Canyon Diablo, he was greatly impressed and insisted that people of this ceremony belonged to clans having the right to gather eagles from nests in the vicinity of the canyon. It is quite possible that such was the case, for certainly the Hopi Indians have very recently practiced this ceremony and still understand it quite fully. In many other characters this culture is suggestive of the Hopis; so it is felt that these people were ancestral to, and contributed to, the development of Hopi culture. It is, therefore, more gratifying than surprising that this ceremony could have been identified so completely by living Hopi Indians, and it gives what the writer believes is probably the longest history—800 years with relatively little or no change in so far as the objects used are concerned—of any one ceremony which is now known in the Southwest.

Speculation as to the wealth represented by the objects buried with this one man is interesting. Certainly those things buried with him, particularly the smaller jewelry types, were about the best of the class that were available. That they came from distant places, or at least that the materials of which they were constituted were taken from far and wide, must be admitted, and to secure objects of such excellence, traded from far away, must have required considerable purchasing power. When it is recalled that not only a few but altogether several hundred separate things, most of them of exceptional nature, were found in this one grave, some concept of the wealth represented may be had.

In the opinion of the writer, there can be no doubt that the man was a very well-to-do individual for his section and time; and he further possessed enough magical power to assure that a good number of these objects would accompany him in death. As his ceremony was one of witchcraft and magic, and as this ceremony is classed as one which could be and was used commonly for the accumulation of wealth, it is logical to asume that he used his knowledge of the ceremony most successfully in amassing a fortune.

There are, however, two other possibilities which must be considered as a source of the many objects. First, in the case of the death of a very important or prominent individual, it was the practice of friends to contribute objects of some worth to be buried with him. Or, secondly, in the case of the death of the last member of a society within a village, all of the objects which formed the ceremonial equipment of that society would be buried with him, for they no longer could be used by anyone in that village. Both of these attitudes and actions may readily have swelled the list of objects of his own ownership.

Any effort to determine the cultural source of the objects is much more difficult, but at least a suggestion of the possible derivation of some may

be undertaken. Since raw lac is confined to plants growing under 3,500 feet altitude, it could not have been found in this immediate vicinity; thus it must have been secured from the desert area. If such is the case, it is also possible that many lac objects were made by desert dwellers. The Hohokam people, occupants of the desert in prehistoric times, knew and made use of similar mosaics of turquoise and other materials at an even earlier date. One of the best mosaics was found in a ball court at Casa Grande Ruins. Therefore, it is quite possible, if not likely, that such things were most commonly made in the south.

Consideration of the basketry leads to more difficulty, for a variety of types are represented. The very fact that there are a variety of types lends strength to the feeling that they were secured from several sections. Unfortunately, there is no absolute proof of any one basket type having been made in any one section of culture. However, one-pieced rod basketry is found as a type with the Hohokam people, as reported in Snaketown, and it is possible that this type also came from the south (Gladwin, Haury, Sayles, and Gladwin, 1937: 159). The use of a filler with the baskets and the painting of this surface are known only from this immediate region of the Plateau, the Verde Valley, and the Gila Valley. This southern occurrence may not be so significant, for the Salado Culture of the north, with which the burial may be affiliated, did reach the Gila and Salt sections at a relatively late date and might have carried this trait there.

Sticks with carved hoofed feet are reported from Wupatki Pueblo, and in the Musum of Northern Arizona collections there is a stick with a carved deer foot from a site in the Verde Valley. In the Southwest Museum there are two objects made of black slate, one with a hand carved on one end, and the other with a carved hoof on one end of it. Both came from Rattlesnake Hill, near Pinedale, Arizona. They are essentially the same in form, size, and carving as the wood examples from the Ridge Ruin burial.

The more or less local distribution of associated objects is indicated by the presence of painted basketry of the type described here, a painted stone bowl, and other painted objects from Wupatki Pueblo, and painted basketry from the Verde Valley sites. In these latter there are also many pieces of jewelry made of turquoise mosaics in which the fragments were set into lac.

From present indications, lignite mirrors seem to have been a trait most commonly distributed to the north and the east of this site. They are found at Pueblo Bonito in northeastern New Mexico, at Betatakin in the Marsh Pass – Tsegi section, and in the intervening areas (McGregor, 1941: 195). As has been suggested before, it is possible that it is adapted from the pyrite mirror of Hohokam and Mexican cultures.

Of the several pottery types represented with this burial, only two, those vessels of Sunset Red and Turkey Hill Red, may be definitely considered a part of the culture to which this man belonged. One other type, Walnut Black-on-White, was made near by, by people of related culture. The rest were exotic, though derived from not far away and all belonged to a generalized Pueblo culture. The ceremony represented by the various carved wood objects has already been pointed out as now being associated with Hopi Indians to the north. Thus there is a good deal of indication that the cultural relationship of the things found with this man are more to the south than to any other section, except to the Pueblo cultures flourishing near by in the Plateau, especially to the north and the east.

The identification of the derivation of actual material objects and materials is a much more simple matter, for in most cases they may be specifically determined as to origin. The paints have already been characterized in some detail, with the suggestion that the malachite and azurite probably came from the Verde Valley. The cinnabar quite likely came from the Globe section to the south. The earths probably came from the Painted Desert section, the specular iron from south of Flagstaff, and the iron pyrite from southern Arizona or Mexico.

The origin of the shells has been determined by Dr. Howard R. Hill and reported in a previous publication (McGregor, 1941: 215). All of the types represented came either from the west coast or from the Gulf of California. The most interesting shaped shell objects are the two pendants in the form of a circle with a fist and armlike projection (see fig. 9). They were identified by Arthur Woodward as a West Coast type of blank from which fishhooks were made.

It has already been suggested that at least some of the very fine bright blue turquoise with this burial must have come from Los Cerrillos in New Mexico. It is of such exceptional quality that this is about the only place known to the writer from which it might have come. The red argil-

lite stone, used in the making of the nose plug worn by the man, certainly came from near Prescott (Bartlett, 1939), and the lignite probably came from somewhere on Black Mesa.

Lac and its various uses have already been discussed. Although the uses are unique to Southwestern archaeology, so far as is now known, the derivation of the material may be suggested. Certainly it could not have come from the higher altitudes, but it was probably gathered from creosote bushes in the Salt River Valley or from the west, near Kingman, if not from farther away.

From the distribution of the various objects, it is obvious that the contacts of the group to which this man belonged must have been very wide indeed to have made possible their collection. Certainly as much as anything else, the complex of objects represented in this one grave has tended to revise the concept long harbored by the writer that the horizons of Southwestern Indians were somewhat limited. When it is recalled that in the room above this burial the skeletons of two parrots were found, trade relations and contacts from as far away as Mexico must be included.

One other consideration of this material remains to be undertaken. This is the artistic evaluation of the objects, for certainly there can be little doubt that many of them are definitely objects of art. One of the most immediately apparent features of all these things is the eminently appropriate character of the design. This is true in every instance, indicating that it was both clearly conceived and skillfully executed. The second most obvious feature is the very pleasing and carefully chosen color combinations in which the designs were made. The third point is that all of the highly conventionalized life forms used are in more or less three dimensional media, such as plastics or shell.

In broad characterization, designs may all be said to be bold, even radical in their vital strength of conception, but in execution many are extraordinarily delicate. There is also a definite rhythm which may be seen in such heavily conventionalized objects as pottery, painted baskets, or even wood, but in no case does this rhythm persist to the point of monotony.

After all this review and summary, the writer cannot help but feel that the individual buried may perhaps best be characterized most simply as "a prominent old man of forty."

Bibliography

Alves, Eileen E. 1930. Shelter caves of the El Paso district. *Bull. Texas Archaeol. and Paleontol. Soc.* **2**: 64–68, 4 pl.

Bartlett, Katharine. 1939. A prehistoric "mine" of red argillite, resembling pipestone, near Del Rio, Arizona. *Mus. Northern Arizona, Mus. Notes,* **11** (12): 75–78, 2 fig.

Colton, Harold S. 1941*a*. Winona and Ridge Ruin, part 2: Notes on the technology and taxonomy of the pottery. *Mus. Northern Arizona Bull.* 19: 1–75, 21 fig.

——. 1941*b*. Prehistoric trade in the Southwest. *Scientific Monthly* **52** (4): 308–319.

Colton, Harold Sellers, and Lyndon Lane Hargrave. 1937. Handbook of northern Arizona pottery wares. *Mus. Northern Arizona Bull.* 11: xiii + 267, 1 pl., 62 fig., 1 map.

Eckholm, Gordon F. 1940. Prehistoric "lacquer" from Sinaloa. *Revista Mexicana Estudios Anthropol.* **4** (1/2): 10–15.

Fewkes, J. Walter. 1898. Preliminary account of an expedition to the Pueblo Ruins near Winslow, Arizona, in 1896. *Ann. Rept. Smithsonian Inst. 1896:* 517–539, 28 pl., 1 map.

——. 1926. Archeological studies of the Wupatki National Monument. *Smithsonian Misc. Coll.* **78** (1): 96–105, 10 fig.

Galbraith, F. W. 1941. Minerals of Arizona. *Arizona Bur. Mines, Geol. Ser. 15, Bull.* 149.

Gladwin, H. S., E. W. Haury, E. B. Sayles, and N. Gladwin. 1937. Excavations at Snaketown. Vol. I. *Medallion Papers* 15.

Hough, Walter. 1902. A collection of Hopi ceremonial pigments. *Ann. Rept. U. S. Nat. Mus. 1900:* 463–471.

——. 1914. Culture of the ancient pueblos of the upper Gila River region, New Mexico and Arizona. *U. S. Nat. Mus. Bull.* 87: xiv + 139, 29 pl., 348 fig.

McGregor, John C. 1941. Winona and Ridge Ruin, part 1: Architecture and material culture. *Mus. Northern Arizona Bull.* 18: 1–309 + [4], 78 fig., 4 maps.

Pepper, George H. 1920. Pueblo Bonito. *Anthropol. Papers Am. Mus. Nat. Hist.* **27**: 1–398, 12 pl., 154 fig., 1 map.

CHRONOLOGY IN THE MIDDLE WEST

FAY-COOPER COLE

University of Chicago

(*Read April 23, 1942*)

A CHINESE proverb says: "If we sit in the bottom of a well, we can say 'Heaven is small.'" To this we might add a modern saying: "If we observe from the air, all nature merges into one vast mosaic."

In the one case our outlook is so circumscribed that our observations—no matter how exact—have little meaning, while in the other our generalizations are likely to be of little value.

In the Middle West archaeological interest goes back to the first days of White settlement, but this interest led chiefly to local collections or to wild speculation. On the whatnot in the corner of the room, or on dusty shelves of college museums, were random samples of savage handiwork gathered without plan or purpose other than possession. Papers presented before local societies dealt mostly with the size and amount of chipping on a projectile point, or sought to connect the builders of the mounds with some lost or distant civilization.

As interest slowly shifted, local investigators dealt in some detail with sites they had dug, and if materials were distinctive or spectacular, they established a "culture." Methods of excavation and recording were not sufficiently exact to detect successive occupations, if indeed they did exist, while lack of any taxonomic system obscured hints of cultural change.

Into this chaotic stage came word of the excavations on the Hopewell farm in Ross County, Ohio. Materials taken from a number of mounds in that area, combined with somewhat similar finds from other sites in the state, led to the recognition of the Hopewell culture. Log tombs, sand lines, quantities of pearls placed with the dead, perforated bear teeth, platform and effigy pipes, copper adzes, cut human and animal jaws, the use of mica, characteristic projectile points and pottery types at once suggested Hopewell. The presence of one or more of these traits in a newly excavated site was enough to label it as related. But continued work in Ohio, also in Wisconsin, and about Davenport in Iowa, made it clear that Hopewell was not the only widespread culture, and soon terms like Adena, Fort Ancient, Woodland, Cahokia, and Mississippi came into vogue.

Cultures became almost as thick as the proverbial fleas on a dog's back and almost as troublesome, since they would not stay put. The excavator had hardly labelled his collection before his neighbor had unearthed a somewhat similar yet divergent culture.

There were many mounds and village sites, but for the most part they were small and gave evidence of rather short usage or occupancy. Long sequences, such as were emerging in the Southwest, were unknown, and it was apparent that the methods employed in the west gave little hope of solving the problems in the Middle West.

Finally serious students began to get together for conferences. Conferences in the field to develop methods of excavation; conferences at museums and universities to discuss problems; conferences in laboratories to evolve determinant characters of artifacts. Dr. Kidder may have started the infection with the Pecos conference, but in the Middle West it became epidemic.

Out of this came exact methods of excavation and recording, and finally the McKern or Mid-West Taxonomic System. This system seeks to show different stages of relationships within large groupings on the basis of recurring traits or a complex of traits. Thus a component is defined as a single manifestation of a culture at one site. Components which are practically identical are combined into a focus; foci with an approximate majority of their traits in common are designated as an aspect. Next in ascending order are phase and pattern.

Today we recognize in the Middle West two large patterns—the Woodland and the Mississippi—each with its subdivisions.

Throughout the area, wherever stratification exists, we find an early Woodland which is characterized by small villages with scanty refuse piles; by crude, heavy, grit- or crushed-rock-tempered ceramics. Pottery is usually cord-marked, conoidal in form, and if decorated has

incised lines near the rim. Projectile points are generally heavy, notched, and stemmed, and appear to have been produced by percussion rather than by pressure flaking. The polished axe is present, but the so-called problematic stones, such as banner stones, plummets, and the like, are rare or lacking in the lower levels. Burials are customarily flexed and are covered with low mounds. The few instances where houses are indicated suggest frail, round structures built of saplings.

We will consider the development of this early Woodland in a moment, but first we should note that we have hints of a pre-pottery horizon in this area which suggests ties with the shell-mound artifacts of the Southeast.

Adams,[1] reporting on rock shelters in the St. Louis area, describes non-pottery horizons below his earliest Woodland manifestation. Again in Jackson County, Illinois, Maxwell[2] finds a non-ceramic level underlying Woodland.

Still older occupation is suggested by the finding throughout the whole of the Middle West of Folsom-like blades. Little data accompany such finds, but apparently most, if not all, have been picked up on the surface.

Returning now to the Woodland Pattern: We have already noted that early manifestations cover the Middle West. In Fulton County of central Illinois we seem to have the longest and most complete sequence, so we deal with this first.

Either the oldest or next to oldest is the Red Ochre manifestation. This is characterized by low, dome-shaped mounds; flexed or cremated burials; an exceedingly crude broken-stone-tempered pottery; by caches of beautifully chipped, leaf-shaped projectile points; by some use of copper pins, beads, and copper breastplates; shell gorgets; cubes of galena; and by profuse sprinkling of red ochre over the remains. Adams[3] reports the same type of pottery from the Rouggly Site in the St. Louis area, while caches of the typical projectile points are noted from Wisconsin. Deuel, Bennett, and others have stressed the resemblances to Adena and seek to equate it to the same approximate time.[4]

[1] Adams, R. M. Archaeological investigations in Jefferson County, Missouri. *Trans. Acad. Sci. St. Louis* **30** (5): 186–197, 1941.

[2] Unpublished mss., Univ. of Chicago. Also Bennett, J. W. Archaeological horizons in southern Illinois. *Trans. Illinois Acad. Sci.*, 1942 (in press).

[3] Adams, R. M. *Op. cit.*, p. 158.

[4] Deuel, T. Basic cultures of the Mississippi Valley. *Am. Anthropologist* **37**, pt. 1 (3). Also Bennett, J. W. *Op. cit.*

Probably as old as Red Ochre is the Black Sand Focus.[5] This fits closely into our general description of early Woodland except that the pottery is of good quality and is distinguished by incising over cord roughening. Perhaps the most important observation here is the fact that all burials show a more long-headed, less Mongoloid physical type than is prevalent in later horizons.

Next is time is the Central Basin phase of Woodland.[6] We have it in stratified sites overlying Red Ochre, while we seem to have cultural continuity running from Black Sand through Central Basin. Here we find a larger population and more extensive settlement possibly based on agriculture, although that is not certain. Pottery is abundant and incised; punched and stamped designs of considerable variety occur. Time does not permit a detailed description, so we only note that it marks an advance on the Woodland foci so far described for the area.

This brings us to the most debatable portion of our discussion. It appears to the speaker that at the time Central Basin was flourishing in central Illinois, Indiana, and Iowa, the so-called Hopewellian culture had already developed many of its essential features in regions to the south, southeast, and possibly in Ohio. Many elements of this cultural phase were either carried to or were diffused to the Central Basin people, were adopted, and out of this fusion came the classical Illinois Hopewell now recognized in a large number of sites.[7]

Griffin, Morgan, and others. Contributions to the archaeology of the Illinois River Valley. *Trans. Am. Philos. Soc.*, n.s., **32**, pt. 1, 1941.

It should be emphasized here that the Hopewell manifestation is still on the phase level. By this I mean it is not represented by a series of sites of practical identity which build up from foci to higher stages. Rather it is recognized by a series of linked traits which justify relationship as a phase.

For the moment I wish to leave central Illinois to note a similar situation which exists in Wisconsin, northwestern Illinois, and near-by parts of Iowa. Here we have the well-defined Lake Michigan phase of Woodland, which probably corresponds roughly in time with Central Basin.[8] In the same area McKern has also recognized a com-

[5] Cole, F.-C., and T. Deuel. *Rediscovering Illinois.* Chicago, 1937. Various references.

[6] *Ibid.* Various references.

[7] Cole and Deuel. *Op. cit.*

[8] McKern, W. C. Various bulletins on effigy mound sites. Pub. Mus. Milwaukee.

plex which was formerly called the "Elemental aspect" of Hopewell.[9] Following the now general consensus of opinion, we will simply designate this as the Hopewell phase. A forthcoming publication by Mr. John Bennett, of the University of Chicago, makes a strong case for the merging of Lake Michigan into Hopewellian in much the same manner as just described for central Illinois.

We now go to the Kincaid site in southern Illinois where cultural stratification is well established. Here we have as our earliest horizon the Baumer focus—typified by rather permanent villages made up of square houses with deep refuse pits. Lithic materials are typically Woodland, but the pottery differs in many respects. It has limestone or crushed-rock temper, flat bottoms, and its surface characteristically has fabric or cord-impressed dowel surfaces. This seems to indicate relationship to a widespread ceramic horizon found in the Tennessee Valley basins. Both Bennett and Griffin[10] see in the pottery, with its occasional cross-hatched rims and zoned decoration, a possible developing Hopewellian strain.

It is significant that at Carbondale, fifty miles to the north, there is a Baumer-like level into which is intruded a well-developed Illinois Hopewell.[11] This would infer that the Baumer Woodland horizon is later than the Central Basin earlier described.

Following Baumer and apparently overlapping it slightly, is the Lewis manifestation, also of Woodland. Here the houses are rectangular, but the slight amount of refuse indicates short residence, at least on the flood plain. Aside from this, the chief variation in the Lewis component is in the clay and grit-tempered pottery. Vessels are thin, hard, and impressed with a cord-wrapped

[9] Cooper, L. R. The Red Cedar River variant of the Wisconsin Hopewell culture. *Bull. Pub. Mus. Milwaukee* 16 (2) : 84, 1933.

[10] Griffin, J. B. Personal communication. Also Bennett, J. W. Archaeological horizons in southern Illinois. *Trans. Illinois Acad. Sci.*, 1942 (in press).

[11] Maxwell, M. Mss. Also Bennett, J. W. *Op. cit.*

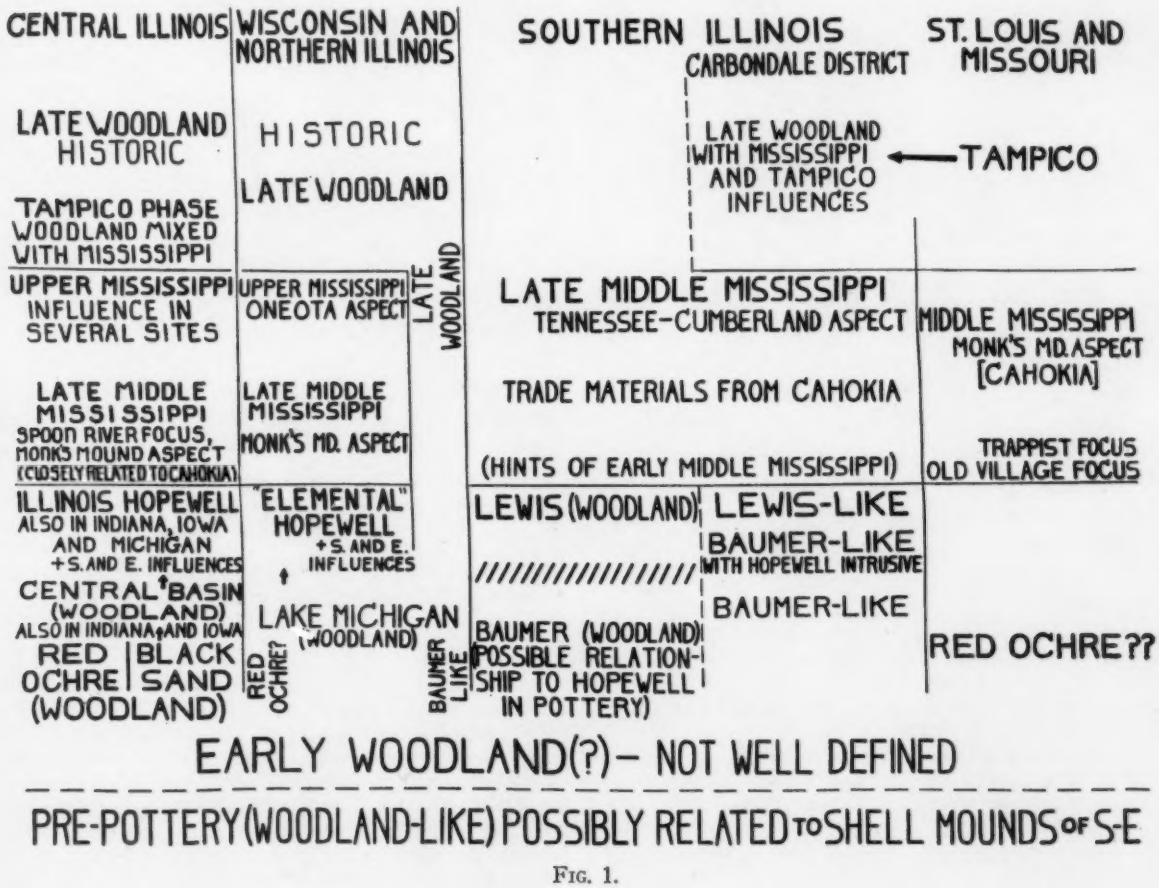

CENTRAL ILLINOIS
WISCONSIN AND NORTHERN ILLINOIS
SOUTHERN ILLINOIS
CARBONDALE DISTRICT
ST. LOUIS AND MISSOURI
LATE WOODLAND HISTORIC
HISTORIC
LATE WOODLAND
LATE WOODLAND WITH MISSISSIPPI AND TAMPICO INFLUENCES
TAMPICO
TAMPICO PHASE WOODLAND MIXED WITH MISSISSIPPI
UPPER MISSISSIPPI INFLUENCE IN SEVERAL SITES
UPPER MISSISSIPPI ONEOTA ASPECT
LATE WOODLAND
LATE MIDDLE MISSISSIPPI TENNESSEE-CUMBERLAND ASPECT
MIDDLE MISSISSIPPI MONK'S MD. ASPECT [CAHOKIA]
LATE MIDDLE MISSISSIPPI SPOON RIVER FOCUS, MONK'S MOUND ASPECT (CLOSELY RELATED TO CAHOKIA)
LATE MIDDLE MISSISSIPPI MONK'S MD. ASPECT
TRADE MATERIALS FROM CAHOKIA
(HINTS OF EARLY MIDDLE MISSISSIPPI)
TRAPPIST FOCUS OLD VILLAGE FOCUS
ILLINOIS HOPEWELL ALSO IN INDIANA, IOWA AND MICHIGAN +S. AND E. INFLUENCES
"ELEMENTAL" HOPEWELL +S. AND E. INFLUENCES
LEWIS (WOODLAND)
LEWIS-LIKE
BAUMER-LIKE WITH HOPEWELL INTRUSIVE
CENTRAL BASIN (WOODLAND) ALSO IN INDIANA AND IOWA
LAKE MICHIGAN (WOODLAND)
BAUMER-LIKE
RED OCHRE | BLACK SAND (WOODLAND)
RED OCHRE?
BAUMER LIKE
BAUMER (WOODLAND) POSSIBLE RELATIONSHIP TO HOPEWELL IN POTTERY)
RED OCHRE??
EARLY WOODLAND(?)– NOT WELL DEFINED
PRE-POTTERY (WOODLAND-LIKE) POSSIBLY RELATED TO SHELL MOUNDS OF S-E

FIG. 1.

paddle. Incising occurs near the rims of specimens; the bases are rounded. This type of pottery seems to have its relationships in a generalized cord-marked horizon found in the Pickwick and Wheeler Basins, and in the fine cord-marked types of the Southeast as well as in Indiana and southern Missouri.[12]

Overlying Lewis and Baumer at Kincaid and their close relatives at Carbondale, is a late Middle Mississippi cultural phase. In central Illinois this overlies Central Basin and Hopewell, while in the St. Louis area two levels of Middle Mississippi succeed early Woodland.

Reference is made in the chart to Cahokia and the Monks Mound aspect of Middle Mississippi. Systematic work in Missouri has only recently been attempted, but evidences to date seem to indicate that in the St. Louis area, close to the Cahokia district across the river in Illinois, we may have a pre-ceramic horizon followed by an early Woodland. Succeeding Woodland components are not sufficiently reported to deal with here, but they are followed by a highly developed aspect of Middle Mississippi in two foci—the Old Village and Trappist.[13] These have direct ties with Middle Mississippi in central Illinois and Wisconsin.

Time allows only the briefest description of Middle Mississippi. Here we find evidence of large fixed settlements with rectangular wattle and daub houses; large truncate mounds which serve as bases for structures apparently religious and ceremonial. Pottery takes on a variety of forms, ranging from large fabric-impressed salt pans to effigy bowls and dishes. Smaller pieces are often equipped with handles, lugs, and legs. Types of decoration are indicated by these slides. Tempering is shell. Stone knives, larger stone implements, and a part of the projectiles are roughly chipped, but characteristic are small triangular arrowpoints produced by pressure flaking. The grooved axe is replaced with the adze. Field utensils such as shell or scapula hoes are common, as are bone awls and similar appliances. Burials are usually in cemeteries, with the bodies at full length and often accompanied with considerable grave goods. Here, and also in the houses, we encounter many ornaments—some of cannel coal, of fluorite, of crystal, and other materials. Shell and bone carving are characteristic of the phase. Stone box burials occur in the later stages.

I think enough has been said to indicate the close relationship of the cultural manifestation with those of Kentucky and Tennessee—to be dealt with in papers which follow.

All workers in the Middle West recognize a second phase of the Mississippi pattern which is known as the Upper Mississippi. In general this is less developed, although it is later in time. The settlements are smaller. There is less variety in pottery forms, and cord-roughening of the exteriors accompanied with broad trailed designs becomes typical. Burial mounds reappear and bodies may be flexed or extended. Snub-nose scrapers, beamers, and a variety of bone artifacts and arrow-shaft abraders are common.

In northern Illinois this phase has been found associated with historic materials; in Wisconsin it can be related to the historic Winnebago and in Iowa with the Ioway Sioux. It is here known as the Oneota aspect of Upper Mississippi. The influence of this aspect can be shown in some Middle Mississippi sites such as the Crable Site in central Illinois and in Jersey County close to the St. Louis area. Bennett[14] also recognizes some Oneota influences in the last stages at Cahokia and a definite mixture of Middle and Upper Mississippi in northwestern Illinois. There may even be a suggestion here of a developmental series from Middle Mississippi to Upper.

Immediately before the entrance of Whites into the area, and for a time after their appearance, we have evidence of extensive shifts in population. A late movement of Woodland peoples pushed in from the north. In some areas it remained a simple Woodland, while in others it apparently fused with Mississippi to produce a mixed horizon which has been called the Tampico Phase of Woodland.[15]

---

[12] See various issues of the Southeastern Archaeological Conference *Newsletter*, and Griffin's ceramic report in Webb, W. S. An archaeological survey of Wheeler Basin on the Tennessee River in northern Alabama. *Bur. Am. Ethnol. Bull.* 122, 1939.

[13] "Trappist" is a term suggested by Griffin to supplant Kelly's "Bean pot culture." See Kelly, A. R. Some problems in recent Cahokia. *Trans. Illinois Acad. Sci.* **25** (4): 101–103, 1933. Also Griffin, J. B. Report on pottery from the St. Louis area. *Missouri Archaeologist* **7** (2): 1–17, 1941.

[14] Bennett, J. W. Archaeological exploration in Jo Daviess County, Ill. (In press, Univ. of Chicago.)

[15] Tampico is also related to the "Stone Vault Grave" sites of northern and central Missouri. See various issues of the *Missouri Archaeologist* for some of these sites. Besides the Gooden Component, reported on in *Rediscovering Illinois*, Griffin has described the Parker Heights Mound in Adams County (Archaeological remains in Adams County). *Trans. Illinois Acad. Sci.* **25** (4), 1933.

Flexed burials in low mounds are accompanied by Woodland pots with squared rims, raised corners, and designs in cord decoration and punch marks. Some have notched lips; collars and lugs also appear. Most projectile points are in the Woodland technique, but some appear to be crude imitations of small Mississippi types. Musselshell spoons, ground snail-shell beads, and abrading stones also indicate this influence. This phase appears to be related to the Stone Vault Grave complex found in Missouri.

This brings us to the end of our series. It may be asked why I have slighted the very rich archaeology of Ohio—the classical home of Hopewell, Adena, and Fort Ancient. One plea is time: another is that speakers who follow must touch on the cultures there represented.

In a recent conference held to discuss problems of the Woodland pattern—you see we still are holding conferences—it was evident that while Woodland sites occur in Ohio, they have not been worked out in sufficient detail to justify treatment here. Adena and Hopewell are strongly represented and are succeeded in time by the Fort Ancient aspect of Upper Mississippi. But here again I am intruding on other speakers.

Indiana and Iowa have been referred to in passing. In general, Indiana conforms closely to central and southern Illinois, while Iowa is close to Wisconsin and northern Illinois.

Minnesota, while imperfectly known, seems to present a Lake Michigan phase of Woodland which in later sites shows blending with Hopewell. Still later the Oneota aspect of Upper Mississippi enters and continues up to historic times along with late Woodland.[16]

In this review I have not attempted to discuss genetic relationships between our successive cultures, although we possess considerable data. Our attempt has been to show that chronology is being achieved in the Middle West and that this promises to be of aid in solving the problems of adjacent areas. Finally: Recent developments in the laboratory of dendrochronology make it clear that at least the later stages of the series can soon be assigned definite dates.

---

[16] Wilford, L. A. A tentative classification of the prehistoric cultures of Minnesota. *Am. Antiquity* **6** (3), 1941.

Photographs of the various pottery types and maps of sites can be found in Winchell, N. H. *The aborigines of Minnesota.* Minnesota Hist. Soc., 1911.

LATE HORIZONS IN THE SOUTHEAST

T. M. N. LEWIS

Division of Anthropology, The University of Tennessee

(*Read April 23, 1942*)

ARCHAEOLOGICAL awakening in the Southeast followed intensive investigation in the Northeast and Middle West. Much of the systematic terminology developed in the latter regions has to some extent been imposed upon archaeological manifestations of the Southeast. These have much in common with those in the northern areas but exhibit regional variations which make it difficult to fit them into the established categories of cultural classification. The taxonomic system is flexible enough to permit its principles being applied to the Southeast, but apparent discrepancies have resulted from the way in which it was applied. Attempts have been made to classify all of southern prehistory on the basis of northern interpretations, in other words, to fit southern cultures into the pigeonholes designed to accommodate those of the northern areas. These attempts at classification were made even before data were completely studied in the Southeast, and the results have gained widespread, if somewhat informal, credence. Consequently most students have hesitated to systematize their conclusions, although they have established foci of culture and valid chronological sequences. Certain of the broader categories of eastern archaeology, such as the Archaic, Woodland, Mississippi, and Hopewellian complexes, are recognized as being applicable to the Southeast, but there is little consensus of opinion as to what trait complexes determine them. Thus, there is the problem of a common understanding which confronts a student who undertakes the task of synthesizing recent trends in the archaeology of any horizon. Furthermore, the intensive work which has been done in the individual southern areas produces myopic perspectives among all of us working in the region.

It would be very convenient if the Southeastern archaeological manifestations occurred in uniform chronological sequences throughout the area so that a discussion could be restricted to one or two of the later periods and thereby be limited to a few cultural entities. Unfortunately, no such ideal archaeological situation exists. Ethnological and historical data are sufficient to indicate that peoples of diverse cultures inhabited the area simultaneously. For example, the peoples of the five major linguistic stocks represented in the Southeast, the Muskhogeans, the Iroquoian Cherokee, the Siouans, the Algonkians, and the Yuchi, were in constant communication but retained a certain amount of individuality in their customs, such as those of burial, house-building, and others, which would be reflected by the archaeological remains in their village sites.

Archaeologically speaking, it has been possible to discern developmental trends and much acculturation. However, the reconstruction of the prehistoric events which produced the historic picture is a complex problem. With the exception of the early cultures designated as Archaic, presumably so classified because of the absence of pottery, almost all of the other recognized manifestations are present in the late horizons, either as major cultures or as minor survivals. There seems to have been a succession of peoples, sometimes with very divergent cultures and at other times with rather similar ones. This succession did not entail complete extinction or disappearance of earlier groups, but was rather a displacement process by which the geographical locations of peoples shifted and cultural provinces overlapped. These peripheral overlappings that occurred as culture centers changed were scenes of wholesale acculturation—at some points even to the extent of a true amalgamation of the peoples. Thus, the late horizons represent genetic cultural heritages as well as borrowed accretions. The rate at which acculturation took place was greatly accelerated in protohistoric times, and during the period in which we have actual historical observations the process was so far advanced that the homogeneity of the groups was more striking than the diversity. This may be due largely to the vigorous expansion of the populous Muskhogean peoples and their flair for political organization.

Roughly speaking, one can separate the late cultures of the Southeast into two groups, namely, the highly sedentary peoples and the semi-sedentary ones. The former were characterized

by complex social and political organizations, predominantly agricultural subsistence, and advanced technologies. The latter peoples were more loosely organized and had smaller social and political units, a predominantly hunting and collecting economy supplemented possibly by a minor amount of agriculture, and in general possessed less elaborate technologies. This division seems to correspond generally to the two eastern culture patterns, Mississippi and Woodland. However, there are other cultural ingredients in the Southeastern manifestations; some of these have counterparts in the northern areas but others are distinctively southeastern and have obscure origins. Time will probably show that the earlier less adulterated manifestations of the Mississippi pattern are to be found in the earlier levels of the Southeast, since the most important determinants for the pattern are more frequently met with in the South and become attenuated as one goes northward. Moreover, great changes in the Mississippi cultures are observable through time in the Southeast. For example, certain of the early Mississippi manifestations lack incised pottery and small triangular projectile points, while some late Mississippi cultures have flexed instead of extended burials, and some lack the characteristic substructure mounds. The cultures which are classified as Woodland in the Southeast exhibit a range of variation and in some cases wide divergence from the northern concept of the pattern. This is due primarily to acculturation, since earlier manifestations show much closer correspondence to the northern cultures. This evidence can be most satisfactorily interpreted as indicating a northern provenience for the Woodland. While Woodland preceded Mississippi cultures in the southern region, there seems little doubt that they persisted in the area during the greater part of the Mississippi occupation and consequently were modified by contact. But this was not the only source of modifications, since prior to the advent of the Mississippi culture, exotic elements appeared in Woodland. These differ in the east-

FIG. 1. A substructure mound on Hiwassee Island, at the confluence of the Tennessee and Hiwassee Rivers. The island contained the occupational remains of a Woodland group which we have termed the Middle Valley aspect; this was the earliest prehistoric group to inhabit the island. One of the burial mounds constructed by this latter group is shown in figure 2. The next occupation was that of an early Middle Mississippi group which we have termed the Hiwassee Island focus. This group was responsible for the construction of the phases comprising the lower half of the mound. The summits of these superimposed phases bore the floor patterns and charred remains of community buildings. Most of the upper portion of the mound was composed of architectural remains of community buildings constructed by a later immigration of Middle Mississippi people designated as the Dallas focus. All archaeological evidence pointed to a peaceful fusion of these two Mississippi groups. The extreme summit bore architectural and other cultural remains of historic Cherokee occupation.

ern and the western portions of the South. In the west the traits bear a similarity to Hopewellian, while in the east they show resemblances to traits associated with the early complicated-stamped pottery horizon.

One of the great difficulties in interpreting later Southeastern horizons is the fact that nearly all of the sites were successively inhabited by peoples of different cultures. Hence the trait lists often include a mixture of early and late traits and result in some confusion when comparative studies are made. Even when the most careful segregation is made in the field and the most critical laboratory checks are applied, it is quite impossible in some instances to eliminate errors of this type. This is particularly true of those sites having an extensive Mississippi occupation where the mixture of materials is the result of construction work and the digging of burial and borrow pits.

Briefly stated, the protohistoric and historic horizons seem to show refocalizations of cultures which were more or less discreet complexes in the earlier horizons. In at least three areas there were early groups who made pottery. In Tennessee the traits agree with the determinants for the Woodland pattern. We consider this as a Southeastern phase in which certain aspects show close resemblances to the early focus of the Northeastern phase in such traits as the grooved axe, steatite vessels, two-holed stone gorgets, conoidal-based pottery vessels of a coarse sand- or grit-tempered ware having surfaces marked with a cord-wrapped dowel or paddle or a woven fabric, fully flexed burials, and circular pits frequently with constricted tops used for storage or cooking. In Florida, Georgia, part of Alabama, and in Louisiana the early cultures seem to be less distinctly Woodland. In the east the St. Simon's and Stallings Island cultures, representing a fiber-tempered pottery horizon, are roughly contemporaneous with the Tennessee Woodland (based upon cross-finds of pottery). In Louisiana, the early Tchefuncte culture having clay-tempered pottery roughly cross-dates with the fiber-tempered horizon and the Tennessee Woodland. Apparently the early pottery-making cultures of Florida, Georgia, Alabama, and Louisiana have more in common with the preceding Archaic cultures than they do with the Woodland, and the ceramic traits may be derived from a different source.

One might speculate that certain fine sand-tempered pottery wares of about this early period in the Southeast are evidence of contact with peoples of more advanced technology. In Louisiana the Tchefuncte culture begins to show new elements such as conical burial mounds, which seem to foreshadow the coming of the Hopewellian-like Marksville culture with its more elaborate expression of the burial mound trait and its more ornate pottery wares. In Alabama evidence, chiefly ceramic, indicates that similar influences were arriving. Fine sand-tempered wares showing incised, pinched, and zoned rocker stamping appear just subsequent to the fiber-tempered horizon, and apparently are contemporaneous with the limestone-tempered wares associated with the Copena complex. In western Tennessee such sand-tempered sherds occur occasionally in the Woodland deposits. It seems likely that cultural influences emanating from Marksville were profoundly modifying the Woodland peoples of the Tennessee Valley as well as the earlier coastal peoples. The Copena culture might be taken as an example. The ceramics are in many cases indistinguishable from those of the simpler Woodland cultures in eastern and western Tennessee. The use of the burial mound suggests an influence derived from the late Tchefuncte-Marksville cultures. But in Copena are certain elements such as check- and complicated-stamped pottery emanating from the east. Farther east the old fiber-tempered pottery horizon was followed by the Deptford and Swift Creek complexes, characterized by fine sand-tempered, check-stamped, and complicated-stamped pottery. The northwest coast of Florida is particularly interesting at this horizon because it shows the eastern stamped pottery complex to have been followed by the Hopewellian-like complex which is designated in Florida as the Santa Rosa and Weeden Island cultures characterized by burial mounds. Apparently the origin of the burial mound complex is to be found in the province of the Hopewellian-like cultures in the Lower Mississippi Valley. It finds expression in Tennessee in a late horizon of the Woodland culture which we have called the Middle Valley aspect, distinguishing it from the earlier Upper Valley aspect. Just prior to the advent of the burial mound complex, Tennessee Woodland culture exhibits Swift Creek and Deptford influence. A similar sequence appears on the Georgia coast where the Deptford complex (lacking in the burial mounds) is followed by the Wilmington and Savannah complexes, although the Savannah period brings us into the horizon in which the Mississippi cultures become a dominant factor.

FIG. 2. A burial mound on Hiwassee Island in the Tennessee River, associated with the second phase of Woodland occupation in the eastern Tennessee area. It was about 40 feet in diameter and 10 feet in height. The truncated appearance is the result of the digging of pits into the top by curio hunters. It was one of a rather numerous group, some of which were excavated by the University of Tennessee, and others by earlier investigators. Generally these mounds contained anywhere from 10 to more than 100 burials of members of the Woodland Middle Valley people.

In four widely separated points there are instances of early Mississippi manifestations. Pyramidal substructure mounds were used as building foundations; dwellings and community buildings were well constructed; community plans showed formal organization, and pottery wares were characterized by bowls, loop-handled jars, twined fabric-marked salt pans, and painted and modelled decoration. These are represented by the "small log town-house" complex of the Norris Basin, and the Hiwassee Island focus of the Chickamauga Basin, the Macon Plateau culture of central Georgia, and the Obion focus in western Tennessee. Such outstanding Mississippi traits as incised pottery and small triangular projectile points appear to be absent from this horizon. In both the Macon Plateau culture and the Obion focus the pottery is grit-tempered. One might suggest that this early Mississippi culture represents an unadulterated manifestation of the basic pattern which, however, was eventually modified by contact with the various cultures already existing in the Southeast.

In Louisiana, Troyville which succeeded Marksville exhibits distinctive Mississippi traits such as substructure mounds, rectangular houses, pottery trowels, and figurines, but retains many of the older Marksville traits. Apparently in Louisiana, in spite of the Marksville emphasis upon burial customs, Troyville shows a scarcity of burials. The Coles Creek period which follows is largely a continuation of Troyville. It seems likely that this area represents a fusion of early Mississippi with Hopewellian-like cultures already established.

Possibly something of the same nature occurred in Alabama where Moundville shows a somewhat similar fusion, with, however, a predominance of Mississippi elements which is even more marked in northern Alabama sites. Northwest Florida shows this same Mississippi impact in the Fort Walton culture which supersedes, but includes many of the old Weeden Island traits. Central

Georgia sites show that the Mississippi cultures fused with earlier ones such as the Swift Creek to produce the Lamar horizon. Etowah seems to exhibit traits of the Lamar type as well as of the Moundville type and thus is quite an exotic hybrid among Southeastern cultures. On the Georgia coast Mississippi influences appearing in the Savannah period become stronger in the Irene horizon.

In the Tennessee Valley and in northern Mississippi, Woodland cultures apparently maintained themselves for some time. Sites resembling the Deasonville complex occur in Mississippi, Alabama, and Tennessee and show an abundance of cord-marked pottery. In Mississippi and western Tennessee such sites demonstrate the gradual intrusion of Mississippi traits such as shell ornaments, rectangular houses, and eventually substructure mounds and typical pottery forms, including trowels and small disks. But also in western Tennessee toward the northern border and along the Mississippi River characteristic Middle Mississippi sites occur at this time and gradually spread throughout the area. These sites show the typical extended Mississippi burials, stone box graves, incised, engraved, and negative painted pottery, small triangular projectile points, some shell gorgets, and extensive use of bone among other traits.

In eastern Tennessee a close resemblance can be found in the Mouse Creeks focus. The somewhat divergent Dallas culture shows many traits in shell, copper, and ceramics comparable with Etowah and Moundville and some Woodland-like traits such as flexed burials and a high proportion of cord-marked pottery.

In almost every area of the Southeast the latest horizons, embracing the protohistoric and historic cultures, are generally attributed to Muskhogean peoples, and since the latest cultural influence which appeared was that of the Mississippi pattern, it seems logical to assume that to a large ex-

FIG. 3. A typical subsurface floor pattern of a dwelling house associated with the Mouse Creeks focus, a protohistoric Middle Mississippi group which inhabited a portion of the eastern Tennessee area. This floor pattern was one of many excavated by the University of Tennessee at a site on the Hiwassee River in Bradley County, Tennessee. The houses were about 20 feet square. Pits were dug to a depth of about 18 inches, and wall posts were set at intervals along them. Other postholes that appear in the photograph probably indicate partitions and supports for furniture. A fireplace with modeled clay rim is in the center of the floor. The two trenches at the upper left suggest some sort of an exterior vestibule entrance. It is assumed that after a house had been erected in one of these shallow pits, earth was banked against the walls to prevent rain water from entering the subsurface floor.

FIG. 4.

FIG. 5.

FIG. 6.

FIG. 7.

FIGS. 4–7. The monolithic axe (fig. 4), stone pipe (fig. 5), and effigy pottery bottles (figs. 6, 7) are products of a Middle Mississippi group belonging to the Dallas focus. All objects, with the exception of the pipe, occurred as burial accompaniments. The pipe was found beneath the charred remains of a community building upon one of the upper building levels of a substructure mound on the bank of the Tennessee River in Roane County, Tennessee. It was often customary for the Dallas people to bury their dignitaries within the substructure mounds. The less important persons were buried in the yards around their homes. The monolithic axe is a remarkable example of the finely executed stonework at which these people were adept. The painted effigy bottles probably had some ceremonial usage, rather than utilitarian.

tent the two may be equated. In Florida the Fort Walton culture is believed to represent the Apalachee and other southern Muskhogean-speaking peoples. In central Georgia the Ocmulgee Fields culture is identified as historic Hitchiti. The Irene culture of the Georgia coastal area, although exhibiting no evidence of contact, is possibly Yamasee or Cusabo (Muskhogean). The Gunterland culture in northeastern Alabama is considered in its periods IV and V to represent respectively the protohistoric and historic horizons of Muskhogean peoples, possibly Koasati or Creek. In central Alabama, the Mississippi manifestation at the Bessemer site is apparently related to both the Gunterland and the Moundville cultures, and an identification is suggested with a Choctaw-speaking group (Napochi). Thus the Moundville elements might represent Choctaw. In Mississippi at Chickasaw Old Fields a somewhat impoverished Mississippi manifestation has been identified as Chickasaw (Muskhogean). In Louisiana the protohistoric Plaquemine, equivalent to the Middle Mississippi type of culture, apparently becomes in the historic period the Natchez culture, again an outstanding example of Mississippi-Muskhogean affiliation.

Tennessee presents a rather complex problem, since the eastern and western portions of the state were separated by the difficult terrain of the plateau region. Movements of peoples and the major lines of communication probably followed the Tennessee River. Thus, the cultural sequences do not coincide except in a very general way, and separate historical interpretations are necessary. So far we have discovered no evidence of historic contact in the numerous sites along the Tennessee River in the western part of the state. Neither is there evidence of historic contact at the large site near Memphis which is very similar to sites in the adjacent area of northern Mississippi. There is a strong possibility that this site does represent prehistoric Chickasaw. Along the Tennessee

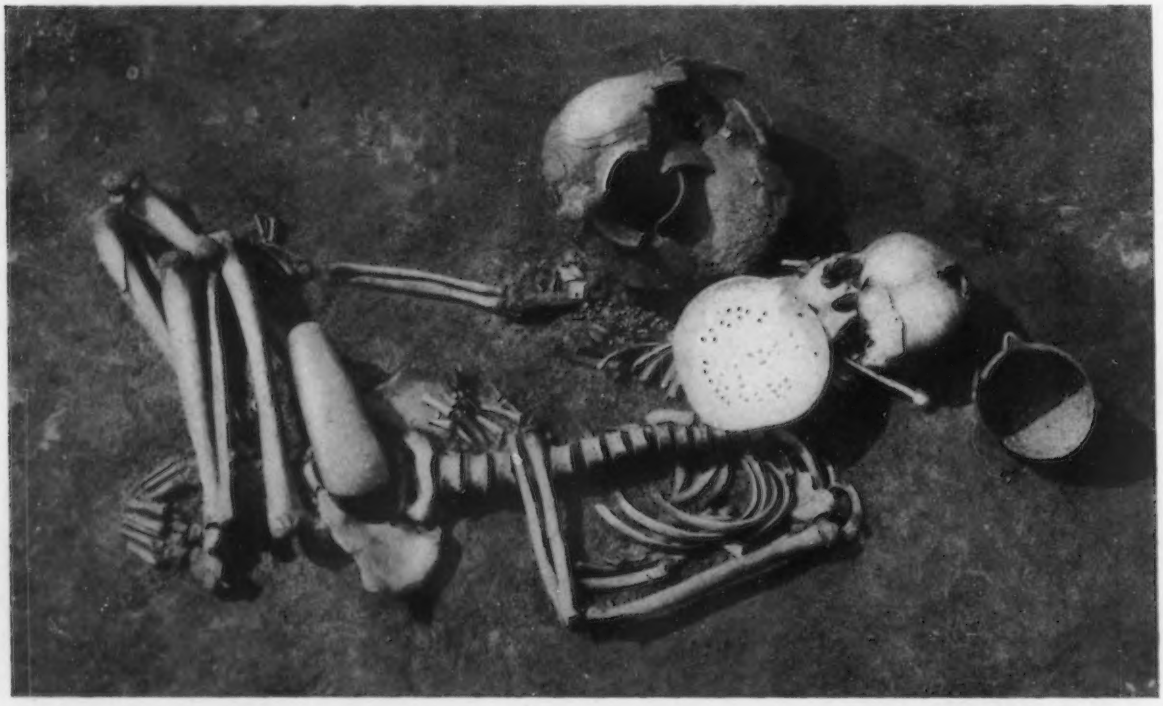


FIG. 8. Burial of a 17-year-old female member of the Dallas group at a village site in Hamilton County, Tennessee. This group, a subdivision of the Middle Mississippi people, lived in eastern Tennessee about 1400–1500 A.D. Two broken pottery vessels lie near the skull. Touching the left mastoid is a shell hairpin made from the columella of a *Busycon* conch. At the left of this object is a shell gorget made from the wall of a *Busycon* conch. This ornament had been suspended from the neck. It was beautifully engraved with representations of human figures and other motifs, and is one of the largest of these objects which has ever been found, being 7 inches in diameter. Beneath it lay a smaller gorget engraved with geometric figures. A turtle-shell rattle had been secured to the right arm. Upon the pelvis lies the stone blade of an axe.

River the older Mississippi levels may be Yuchi and the later ones Chickasaw. However, there are many sites in this western region which seem to be basically Woodland, although strongly acculturated by Mississippi influence. These sites can be arranged in a series from those showing little or no Mississippi traits to those having many elements. These may represent the culture of the protohistoric Shawnee. The recent rather tentatively suggested relationship between the Fort Ancient culture and the Shawnee peoples in Kentucky may be a late example of Woodland-Mississippi hybridization.

Eastern Tennessee reveals two protohistoric complexes, the Dallas focus identified as Muskhogean, and the Mouse Creeks focus attributed to the Yuchi. The only culture which reveals historic contact is that which we have identified as Cherokee and designate as the Overhill focus, an extremely late manifestation which occurs principally as the historically documented villages on the Little Tennessee and Hiwassee Rivers. The stamped pottery and pipes are comparable with certain materials from the Peachtree site in North Carolina, which the investigators have tentatively identified as Cherokee. The very definite association of check-stamped and complicated-stamped pottery with historic Cherokee culture is a fact of prime importance in southeastern prehistory. It suggests that the Cherokee may have been responsible for a series of cultures of respectable antiquity which centered in Georgia and influenced both the early Woodland peoples and the later Mississippi Muskhogeans. In early horizons the two pottery types practically always occur together, as for example in the Swift Creek, Deptford, and Savannah complexes, but in the later cultures such as Lamar and Irene, which are strongly Mississippian, only the complicated-stamped ware persisted. The theory of a relatively recent (seventeenth century) separation of the Cherokee from the northern Iroquoian groups and their entry into the Southeast from a northeasterly direction becomes debatable in the face of this interpretation. By this period the check-stamp had disappeared, and it is inconceivable that the Cherokee, as newcomers, would have acquired it. It seems more plausible to think that the Cherokee proper were largely displaced by the incoming Muskhogeans and retired to the mountain fastnesses where they formed themselves into a strong nation which was frequently in conflict with the Muskhogeans. The further implication of this idea is that the early home of the Iroquoian-speaking peoples was in the Southeast and that the northern groups migrated into the Northeast as a result of Muskhogean pressure.

In North Carolina a relationship has been established between the archaeology and the historic Catawba (Siouan) occupation. The problem of the southeastern Siouans is a most difficult one, and in time archaeology may provide a solution. A number of students believe the original home of the Siouans to have been in the east rather than the west, and one is tempted to look for evidence of their former widespread occupancy of this area in the Archaic cultures. If, as has been suggested, the late Archaic cultures developed into the early pottery-making cultures in Louisiana, Georgia, and Florida, it is also possible that such groups continued to exist as peoples more or less marginal to the later southeastern cultures, as for example the Ofo, Biloxi, Catawba, and a few other Appalachian mountain tribes. It is interesting to recall that the only reference to historic peoples using vegetable matter to temper their pottery is that of Palmer in 1884 concerning the Catawba. This observation might be regarded as indicating a survival of the early fiber-tempered pottery horizon.

Most interpretations seem to assume the extinction, absorption, or some manner of disappearance of the Hopewellian culture. One might speculate that the Chitimacha, an important historic Louisiana group, possibly represents a survival of the Hopewellian-like cultures of that area such as Marksville. This suggestion is made on the basis of recorded Chitimacha traits, among which are mound burial, artificial head deformation, a variety of copper objects such as finger rings, bracelets, breastplates, and head-dresses, and grit-tempered pottery.

Any discussion of late horizons in the Southeast becomes somewhat complicated owing to the complex nature of aboriginal relationships in the area. Very extensive archaeological work has been carried on during the past eight or nine years. As further scientific reports are published, more accurate comparative studies will be made possible, and future attempts to synthesize will produce a clearer picture than is possible at the present moment.

LITERATURE

CALDWELL, JOSEPH, AND CATHERINE MCCANN. Irene Mound Site. University of Georgia Press. 1941.

DEJARNETTE, DAVID L., AND STEVE B. WIMBERLEY. The Bessemer Site. *Geol. Survey Alabama, Mus. Paper* 17, 1941.

FAIRBANKS, CHARLES H. The taxonomic position of Stallings Island, Georgia. *Am. Antiquity* **7** (3), 1942.

FORD, J. A., AND GORDON R. WILLEY. Crooks Site, a Marksville Period burial mound in La Salle Parish, Louisiana. *Louisiana Dept. Conservation, Anthropol. Study* 3, 1940.

FORD, J. A., AND GORDON R. WILLEY. An interpretation of the prehistory of the United States. *Am. Anthropologist* **43** (3), 1941.

JENNINGS, J. D. Recent excavations at the Lamar Site. *Proc. Soc. Georgia Archaeology* **2** (2), 1939.

JENNINGS, J. D. Chickasaw and earlier Indian cultures of northeast Mississippi. *Jour. Mississippi Hist.* **3** (3), 1941.

KELLY, A. R. A preliminary report on archeological explorations at Macon, Ga. *Bur. Am. Ethnol. Bull.* 119, *Anthropol. Papers* 1, 1938.

QUIMBY, GEORGE I. The Natchezan culture type. *Am. Antiquity* **7** (3), 1942.

SETZLER, FRANK M., AND JESSE D. JENNINGS. Peachtree Mound and village site, Cherokee County, North Carolina. *Bur. Am. Ethnol. Bull.* 131, 1941.

WALKER, WINSLOW M. The Troyville Mounds, Catahoula Parish, La. *Bur. Am. Ethnol. Bull.* 113, 1936.

WEBB, WILLIAM S. An archaeological survey of the Norris Basin in eastern Tennessee. *Bur. Am. Ethnol. Bull.* 118, 1938.

WILLEY, GORDON R., AND R. B. WOODBURY. A chronological outline for the northwest Florida coast. *Am. Antiquity* **7** (3), 1942.

Personal communications:
Charles Fairbanks.
Joffre Coe.
George Quimby.
Charles Wilder.

RECENT ADVANCES IN NEW YORK STATE AND THE NORTHEAST

WILLIAM A. RITCHIE

Rochester Museum of Arts and Sciences

(*Read April 23, 1942*)

DOUBTLESS the most significant recent discoveries in New York State and the northeastern area pertain to one of the earliest revealed phases of its inhabitation, which we have designated the Laurentian Aspect and lately assigned to the Archaic Pattern.[1]

The fact of the existence of a primary underlying archaic level, characterized by distinctive positive and negative traits, beneath a whole series of subsequent occupations,[2] first became definitely established through the exploration of the extensive settlement site at Lamoka Lake, Schuyler County, in south central New York, between 1925 and 1928 (Ritchie, 1932). Confirmation of the relatively primitive economic stage disclosed by these excavations was later provided by other refuse-bearing stations in the central and western portions of the same state (Ritchie, 1936), and, in the light of widely scattered surface traces of diagnostic tool and weapon types, it became obvious that at some indefinable early period a narrow-skulled, narrow-faced, hunting-fishing-gathering people, ignorant of the arts of the potter and horticulturist, and unequipped with such devices of subsequent cultures as native copper tools, shell ornaments, and the smoking pipe, to mention only the most salient, roamed at least over southwestern Ontario, most of New York, and northeastern Pennsylvania. Their rich bone inventory included the fishhook and fish gorge, but lacked the barbed bone point and harpoon, while of the hunting equipment narrow-bladed points, both large and small, predominated. Use was made of the dog, of ungrooved axes and adzes, including a diagnostic beveled form of the latter, but neither the grooved axe nor the gouge was employed, and none of the so-called "problematical forms" (gorgets, bannerstones, birdstones, etc.) have come to light.[3] In view of the abundance of acorn shells at the key site on Lamoka Lake,[4] the considerable number of grinding implements—mortars, mullers, pestles—is not surprising, and it must be concluded that vegetal food resources were of much importance, although it is very probable that premaize horticulture was not a feature of the complex.

Within the past eight years the presence of a cognate racial type and culture has been shown over a wide portion of the Southeast,[5] and even in the Mississippi Valley (Lilly, 1937: 100–101; Miller, 1941), and the probability looms rather large that future archaeological research will ultimately broaden the recognized extent and perhaps establish a temporal and basic physical and cultural affiliation between the eastern Archaic and the early Basket Maker horizon in the Southwest.

The second or Laurentian manifestation of the Archaic Pattern in the Northeast is of very recent demonstration, although certain of the discoveries to be briefly outlined were foreshadowed many years ago by Willoughby (1898; 1915) and Moorehead (1922: 9–150) under the name of the "Red Paint culture" of Maine and by Parker (1922: 79–83) in his "Eskimo-like culture" of New York.

Simultaneously in 1937–38, the Champlain Valley Archaeological Society and the Rochester Museum of Arts and Sciences conducted near Vergennes, Vermont (Bailey, 1939), and at Brewerton in central New York (Ritchie, 1940), respectively, excavations which, supported by yet more recent investigations (1939–40) by the latter institution on Frontenac Island, also in central New York (Ritchie, 1939*a*; 1939*b*), disclosed in the aggregate an indubitably related, extensive artifact assemblage. This, to enumerate only the chief

[1] The terminology is in accordance with the Midwestern Taxonomic Method (see McKern, 1939: 301–313).

[2] For a summary of these, see Ritchie (1938: 94–112).

[3] Incidentally, the cultural provenience of most types of these articles has been established for New York (Ritchie, Ms.).

[4] The probability that this find indicates early knowledge of leaching with wood ashes, a persisting practice transferred by later peoples to corn preparation, has been suggested to the writer by Prof. Ralph Linton.

[5] The first recorded site was partially excavated by Moore in 1915, at Indian Knoll, Kentucky (see Moore, 1916: 431–487; *cf.* Haag, 1942: 209–214, 219–222, and Webb and DeJarnette, 1942: 306–319, 403–428, for concise account and bibliography).

markers, embraces a host of chipped flint types, mainly an assortment of broad heavy points; gouges; plummets; bannerstones of simple forms; chipped and ground slate ulus and points; native copper tools; bone harpoon points; and several styles of pottery, the last occurring throughout the relatively thin relic-bearing zone at Vergennes, but present only as an introduced increment in the upper level at the Brewerton stations and absent from the Archaic layer of the stratified Frontenac Island site.

Sustained by the testimony of surface-gathered materials and certain per se less convincing subsurface aggregations (enumerated in Ritchie, 1940: 92–98), this newly defined Laurentian Aspect vastly expands and clarifies our perspective of northeastern prehistory, inasmuch as in one focal development or another it appears to represent the major early pre-sedentary occupation over much of the area and to equate with the paleo-Algonkian stratum postulated by Speck (1926: 309). As yet it may be viewed only in bold configuration, for many of the problems of detail are still unresolved, including the matter of probable Laurentian and Eskimo interrelations, and the quantitative connections existing between the imperfectly defined foci of the Laurentian Aspect and the "Red Paint culture" of Maine. Progress in the latter subject awaits the report of Byers and Johnson, of Phillips Academy, on their excavations of 1936–37 at Blue Hill, Maine. We are also confronted with the unanticipated fact of a strong brachycephalic factor in the Laurentian physical type, as revealed particularly at Frontenac Island. This broad-headed element and its associated diversified Laurentian congeries seem, from the considerable body of evidence unearthed on the latter site, to have amalgamated with and probably finally submerged the Lamoka complex, which had its inception in a different and doubtless earlier physical and cultural stratum.

Despite these imperfections of knowledge, however, the qualitative results obtained in cultural analysis from systematic excavation of these heretofore unknown or obscure fundamental manifestations constitute a major advance in the decipherment of northeastern prehistory, which is essentially an achievement of recent years.

Bibliography

Bailey, John H. 1939. A ground slate producing site near Vergennes, Vermont. *Bull. Champlain Valley Archaeol. Soc.* **1** (2).

Haag, William G. 1942. Early horizons in the Southeast. *Am. Antiquity* **7** (3).

Lilly, Eli. 1937. Prehistoric antiquities of Indiana. Indiana Historical Society, Indianapolis.

McKern, W. C. 1939. The Midwestern Taxonomic Method as an aid to archaeological culture study. *Am. Antiquity* **4** (4).

Miller, Rex K. 1941. McCain site, Dubois County, Indiana. *Indiana Hist. Soc., Prehistoric Research Ser.* **2** (1).

Moore, Clarence B. 1916. Some aboriginal sites on Green River, Kentucky. *Jour. Acad. Nat. Sci. Philadelphia,* ser. 2, **16**, pt. 3.

Moorehead, Warren K. 1922. The archaeology of Maine. Andover, Mass.

Parker, Arthur C. 1922. The archaeological history of New York. *New York State Mus. Bull.* 235.

Ritchie, William A. 1932. The Lamoka Lake site. *Researches and Trans. New York State Archeol. Assoc.* **7** (4).

——. 1936. New evidence relating to the archaic occupation of New York. *Researches and Trans. New York State Archeol. Assoc.* **8** (1).

——. 1938. A perspective of northeastern archaeology. *Am. Antiquity* **4** (2).

——. 1939*a*. A village and burial site on Frontenac Island. *Rochester Mus. Arts and Sci. Mus. Service,* October–November.

——. 1939*b*. The Frontenac Island village and burial site. *Rochester Mus. Arts and Sci. Mus. Service,* November–December.

——. 1940. Two prehistoric village sites at Brewerton, New York, type components of the Brewerton Focus, Laurentian Aspect. *Rochester Mus. Arts and Sci. Research Records,* no. 5.

——. Ms. (1941). The pre-Iroquoian occupations of New York State.

Speck, Frank G. 1926. Culture problems in northeastern North America. *Proc. Am. Philos. Soc.* **65**.

Webb, William S., and David L. DeJarnette. 1942. An archeological survey of Pickwick Basin in the adjacent portions of the states of Alabama, Mississippi and Tennessee. *Bur. Am. Ethnol. Bull.* 129.

Willoughby, Charles C. 1898. Prehistoric burial places in Maine. *Papers Peabody Mus. Harvard Univ.* **1** (6).

——. 1915. The "Red Paint People" of Maine. *Am. Anthropologist* **17**.

THE EFFECT OF THE ABBOTT FARM ON EASTERN CHRONOLOGY

DOROTHY CROSS

Hunter College

(*Read April 23, 1942*)

THE Abbott Farm extends along the Delaware River bluff two miles south of Trenton, New Jersey. At this point, the bluff averages 40 feet in height and is separated from the river by a 0.9-mile strip of marshland through which meandering streams flow.

The site attracted archaeological and geological attention in 1872 when the former owner, Dr. Charles Conrad Abbott,[1] reported the finding of crude argillite implements in association with Delaware Indian remains. These "implements" superficially resemble Old World paleoliths, and when similar finds were made in the "Trenton gravels," an outwash of the last (Wisconsin) glaciation, he assumed they had been fashioned by an ancient or "glacial" man. After subsequent investigation, Dr. Abbott concluded that this area contained the remains of three presumably distinct cultures: (1) the earliest, represented by "paleoliths" of glacial or pre-glacial age, occurring in the gravel stratum; (2) an intermediate culture of considerable antiquity typified by the absence of pottery and the presence of a crude stone industry, largely of argillite, found in the overlying yellow sand; (3) a recent culture which he ascribed to the historic Delaware, found in the topmost stratum of black soil or humus.

The work of Volk[2] from 1889 to 1910 and of Spier[3] in 1914 and 1915 ignored the alleged "paleolithic" deposits but substantiated the presence of a distinct argillite culture, devoid of pottery, in the yellow sand. In addition, Spier discovered that the distribution of pebbles coincided with the distribution of artifacts, thus indicating that both had been deposited by the same agency, either wind or water. In other words, the artifacts had been moved by natural agencies after their original deposition.

In an attempt to elucidate the many problems created by the above-mentioned premises, the New Jersey State Museum, aided by WPA funds, excavated the site for five years from April, 1936, to March, 1941. These investigations may be divided into two parts: (1) the excavations on the bluff, some of which were adjacent to those of the former excavators; and (2) the excavations in the marshy lowlands at the foot of the bluff, paralleling those of Volk. In the removal of 700,000 cubic feet of earth from an area of 200,000 square feet, more than 20,000 artifacts and 75,000 potsherds were found. These results have not only made it possible to disprove former theories but they have shed new light on the chronology of the Eastern area.

To clear up the old problems before new ones are presented, the recent excavations produced only negative evidence for the "paleolithic" question. No cultural remains were found in the "Trenton gravels" either in the excavations or in a series of trenches cutting the bluff. Blanks of all common materials, resembling the so-called paleoliths and undoubtedly mistaken for them, were found at all depths throughout the excavations. A number of yellow jasper blanks, with exceedingly sharp edges, preclude any claim to antiquity.

As for the second problem, namely that of an argillite culture devoid of pottery and distinct from the culture in the humus, none of the excavations, not even those paralleling and bisecting the trenches of former excavators, substantiated this theory.

Cross-sections of the bluff excavations disclosed that the soil strata are fairly consistent. From 6 to 10 inches of humus overlies a 5-foot layer of yellow sand, which, in turn, overlies the "Trenton gravels," an outwash of the last (Wisconsin) glaciation. This gravel averages between 12 and 15 feet in thickness and in some parts of the site merges with Early Pleistocene (Pensauken) gravel underlain by Cretaceous clay. Most of the archaeological material came from the yellow sand.

[1] Abbott, Charles Conrad. The Stone Age in New Jersey. *Am. Naturalist* **6**: 144–60, 199–229, 1872.

[2] Volk, Ernest. The archaeology of the Delaware Valley. *Papers Peabody Mus. Am. Archaeol. and Ethnol.* **5**, 1911.

[3] Spier, Leslie. The Trenton argillite culture. *Anthropol. Papers Am. Mus. Nat. Hist.* **22**: 167–226, 1918.

In all of the bluff excavations, the artifacts had a vertical distribution typical of most New Jersey sites, *i.e.*, they fell into a normal frequency curve with the peak in the yellow sand a few inches below the humus. As the greater part of the Abbott site has been cultivated, the humus usually coincides with the plow line.

The following results are based largely upon material from Excavation 9, which extended for 510 feet along the edge of the bluff, because this is the only bluff excavation completely studied to date. It covered about two-fifths of the bluff territory investigated, and sample testing of the remaining excavations indicate that it will prove typical of the whole.

The stone artifacts in Excavation 9 were distributed from the surface to a depth of 5 feet, with an average of 17.4 inches, which is a little deeper. than most bluff excavations, undoubtedly owing to the fact that the humus was very thick in parts of this area. The average depth in Excavation 2, the second largest on the bluff and a little farther inland than Excavation 9, is 13.5 inches. Potsherds, found in large numbers throughout the yellow sand, had a slightly shallower (16.2 inches) mean in Excavation 9 and a slightly deeper one (14.4 inches) in Excavation 2. This distribution, following a normal frequency curve, is probably a false one, the material originally showing a gradual increase from the lowermost depth to the surface. It is reasonable to assume that the artifacts in the first 10 inches or so would have been constantly turned over by the plow for the preying eyes of collectors who have combed the site for 70 years, thus decreasing their frequency in the humus layer. Whether true or false in its upper limits, this even frequency curve clearly indicates that there were no distinct former points of concentration or, if there were, we should expect the curve to exhibit more than one peak.

All of the common materials employed were found at all depths and had comparable frequency curves: argillite and shale, with average depths of 15.0 and 17.7 inches; flint, jasper, chert, and chalcedony, with means of 17.3, 16.6, 15.5, and 18.3 inches respectively; quartz—17.6 inches; quartzite—18.5 inches; and sandstone—20.4 inches. The deeper mean for sandstone can probably be accounted for by the fact that artifacts made from this material are heavier and larger. Greater sinking might have occurred, and all those within the plow line certainly would have been picked up.

Shale, not argillite, was the most common material on the bluff, having been used for 39.2 per cent of the artifacts in Excavation 9. Argillite and combined flinty materials are second with 19.8 per cent each, followed by sandstone—16.3 per cent, quartz—2.0 per cent, and quartzite—1.6 per cent.

Types of artifacts vary but little throughout, and from the greatest depth to the surface they show only minor differences, which are quantitative rather than qualitative. The number of qualitative differences is exceedingly small and could be attributed to internal development, minor infiltration, or trade. The most common artifacts at all depths were plain-stemmed and side-notched arrow points and leaf-shaped and slightly stemmed blades and spear points, many stemmed on only one side. These are usually of shale or argillite, but other rocks are well represented. Although the leaf-shaped blade is certainly diagnostic of the Abbott component, there is no evidence that it is typical of a culture which can be called distinct from the culture as a whole. The finding of a well-piled cache of 126 unused argillite blades of this type, with a 14-inch copper pin stuck horizontally through the heap near the bottom, clearly shows that they were also made by historic Indians.

Pottery, not too well-baked, usually grit-tempered and often bearing elaborate incised, cord-wound stick and dentate-stamped geometric designs, shows the same homogeneity.

Bone, clay, and copper artifacts are too rare to lend weight to a distribution argument. Contact material is also scarce and is not found at any considerable depth.

The excavations in the lowlands at the foot of the bluff, bordering a small creek, exhibited an entirely different stratification. Most of the artifacts were in three former humus layers or in pits dug from them, the intervening layers of sand and gravel being practically sterile. This area has been identified as an alluvial fan, the recent age of which is attested by the cultural remains. The present surface slopes toward the creek as does the second humus from the top. At the base of the bluff the humus layers are distinct, but near the creek the second and third merge. It was not possible to trace the fourth or lowermost humus throughout the excavations because it was below the level of the creek, and although pumps were employed in excavating, most of its contents were unearthed under water. Additional digging

during an exceedingly dry period would be profitable. Near the bluff, the top of the fourth humus was 9 feet below the present surface, and tests made at various points indicate that it follows the flood-plain surface.

Cultural remains in each humus were very similar and, in general, substantiated the results obtained on the bluff. Pottery of the same type was found in all humus layers, as were all the common types of artifacts. Contact material, however, was found only in the first and second layers.

Contrary to the bluff excavations, argillite was more prevalent than shale: 43.8 to 15.6 per cent in the first humus; 48.4 to 12.8 per cent in the second; 63.8 to 12.0 per cent in the third; but 18.5 to 24.1 per cent in the fourth. This difference cannot be accounted for by greater numbers of certain types of artifacts which might be more frequently made from one material or the other. However, as the difference between these two argillaceous materials is determined on surface hardness, perhaps the soil conditions in the lowlands have retarded weathering.

Although the 59 stone artifacts from the fourth humus are not statistically valid, it is interesting to note that the combined percentage of argillaceous material (42.6 per cent) is less than the combined percentage of flinty material (46.3 per cent). Further inconsistency is shown by the fact that the three arrow points found in this humus are of flint, one an equilateral triangular point, a type which has the shallowest distribution of any implement at the Abbott Farm.

Thus, in light of the above evidence, we can only conclude that the excavations on both the bluff and the lowlands indicate that there was but one fairly homogeneous culture from the lowermost to the topmost levels, and that at no point can an "argillite" culture be defined as distinct from the culture as a whole. Argillaceous material predominates as it does on most central New Jersey sites, undoubtedly because they are near the natural source of supply. In addition, the same evidence shows that even the earliest inhabitants of the Abbott Farm were acquainted with ceramics.

Finally we come to the third problem, as to whether the material had been moved by natural agencies after its original deposition, as suggested by Spier. Several hundred pits were found on the bluff and sixty-two in the lowlands. Caches and hearths occurred throughout. Large storage pots were found broken but complete, where they evidently had been sunk with their rims flush with the contemporary floor level. None of this material differed measurably from that found loose in the ground at various depths, so there seems to be no proof of such an assumption.

However, it still remains to determine the manner in which the material on the bluff was deposited, or rather, what would cause some of the material to be found at considerable depths. The culture being fairly homogeneous and probably none of it very old, we cannot suppose that the surface of the entire site has risen 5 feet, or from the depth of the lowermost artifacts. It would have taken too violent a wind and much too high a flood, for which there is no geological or climatological evidence, for 5 feet of earth to be accumulated in a relatively short period.

A few years ago Richards,[4] who conducted a large part of the recent geological work at the Abbott Farm, proposed a plausible theory. He suggested that if the topography of the site during aboriginal occupation had been more hummocky than it is today, some artifacts might have been dropped in low areas and subsequently covered, partly by wind-blown sand and partly by sand and pebbles carried by slope wash from some near-by higher portion of the site. Statistical studies of the horizontal distribution of artifacts by depths, which would undoubtedly aid in proving or disproving this theory, have not been completed to date. However, there is some favorable evidence in the finding of hand-wrought nails 4 feet below the surface in the dark soil of a sink hole, which shows how quickly at least one depression has filled up. This theory would also account for the presence and peculiar distribution of the many pebbles in the yellow sand which attracted the attention of Spier.

After briefly dispensing with the internal problems of the site, we must now see how the Abbott material fits into already delineated cultures and how it affects the chronology of the Eastern area. Time will not permit the presentation of the complete trait list; so it must suffice to state that the majority of the artifacts fit into the Coastal Aspect of the Northeastern Phase of the Woodland Pattern as determined by Ritchie[5] and substantiated by other recently excavated sites in New Jersey.[6]

[4] Richards, Horace G. Reconsideration of the dating of the Abbott Farm site at Trenton, N. J. *Am. Jour. Sci.* **237**: 345–54, 1939.

[5] Ritchie, William A. A perspective of Northeastern archaeology. *Am. Antiquity* **4** (2): 103–104, 1938.

[6] Cross, Dorothy. *Archaeology of New Jersey.* Vol. 1. Trenton, 1941.

As would be anticipated, the Abbott material on the whole fits into what has been designated as the "Early" Focus of the Coastal Aspect, although diagnostic traits of the "Late" Focus are present. Traits of these two foci are well integrated on most New Jersey sites, temporal implications being lacking; so it was deemed advisable to substitute two foci names more closely fitting New Jersey material: Red Valley to correspond to the "Early" Focus, and Rosenkrans, to the "Late."[7] These terms were derived from names of two New Jersey sites, Red Valley in the central part of the state and Rosenkrans in the extreme northern section. Although most of the Abbott material definitely fits into the Red Valley Focus, typified by the grooved axe, oval celt, adz, banner stone, gorget, bola stone, sinew stone, anvil or shallow mortar, cylindrical pestle, shaft-smoother, chipped hoe, plain-stemmed, side-and oblique-notched projectile points with both narrow and wide blades, leaf-shaped, triangular, convex-based, lozenge and bifurcate-based points, flat-based pots with flaring rims, pointed-based pots with constricted necks, paddled-cord and cord-wound stick surface finish, grit-tempering, and flexed burials, usually unaccompanied, there are some differences, the numerical weighting of which would change percentages for the entire focus. For example, at the Abbott Farm, the leaf-shaped projectile point and blade is second only to the plain-stemmed form; the full-grooved axe is much more prevalent than the three-quarter-grooved axe; gorgets, often intricately incised, are very common; gouges are absent; adzes, rare; banner stones are relatively scarce, poorly made, and frequently of the short-winged type; thumb-scrapers are rare, but the larger oval and triangular end-scraper, sometimes stemmed, is still the most common form; bone and antler work, including eyed needles, splinter awls, arrow points, and perforated harpoons, is more numerous and better made; pottery is more varied in shape and more elaborately decorated; burials are sometimes extended. In content, the Abbott component tends to draw the Red Valley Focus closer to what was originally designated as the "Early" Focus.

Some of the differences between the Abbott component and others in the Red Valley Focus may be due to the mixing of traits of the Rosenkrans or "Late" Focus. Among these might be the more elaborately incised pottery, finer bone work, and paucity of banner stones. However, there seem to be no temporal differences between these traits and those more typical of the Red Valley Focus. Incised pottery, in considerable quantities, is found at all depths on the Abbott bluff and in all former humus layers in the lowlands. Most of the bone and antler material came from the lowlands, where it is about evenly divided between the second and third humus layers. The greater frequency of bone artifacts in the lowlands might be attributed to soil conditions, for animal bone refuse occurred in comparable frequencies. The twenty banner stones and fragments, all from the bluff, ranged from 8 to 49 inches in depth with an average of 18.8 inches.

This apparent disregard of temporal sequences is also noted in traits which are more closely associated with other aspects and foci in areas bordering New Jersey. For the most part, these traits are rare at the Abbott Farm as they were in other New Jersey sites. Among these may be mentioned steatite sherds, semi-lunar knives and plummets which Ritchie[8] associates with the Laurentian Aspect, although Skinner[9] noted them in Coastal Algonkin. The three plummets from the Abbott Farm were fairly deep, distributed from 24 to 29 inches with a mean of 26.3 inches. On the other hand, the nine semi-lunars and fragments were shallow, ranging from 5 to 23 inches in depth with a mean of 16.0 inches, as were the 10 steatite sherds, which ranged from 8 to 19 inches with a mean of 12.0 inches.

Traits associated with the Owasco Aspect in New York or Pennsylvania, such as triangular drills, stone disks, and rolled copper beads, behave in much the same manner. Several hundred rolled copper beads were found with a scattered group burial on the bluff with copper gorgetlike objects and a rectangular slate pendant, clearly showing relationship to this aspect. However, accompanying material included leaf-shaped blades and pottery typical of the site as a whole. Similar rolled copper beads were found in a pit dug from the third humus of the lowlands.

The finding of Susquehannock pottery in a pit on the bluff and of an Iroquoian pipe with a burial below the second humus in the lowlands, both in association with typical Abbott material, may be accounted for by trade.

[7] *Ibid.*, p. 211.

[8] Ritchie, William A. Two prehistoric village sites at Brewerton, New York. *Research Records Rochester Mus. Arts and Sci.*, no. 5, p. 94, 1940.

[9] Skinner, Alanson. Archaeology of the New York Coastal Algonkin. *Anthropol. Papers Am. Mus. Nat. Hist.* **3**: 218, 220, 222, 1909.

Of course, if the remains at the Abbott Farm were originally deposited in a hummocky topography, the contours of which would be constantly changing, we should not necessarily expect to find a correlation between depth and time. Early remains could have been deposited on high places and later ones in low places. Horizontal groupings, when completely worked out, may throw added light upon this problem. Horizontal groupings in other New Jersey sites were not significant, and sample testings at the Abbott Farm are equally discouraging. For example, the finest semi-lunar knife was found alongside of a typical flat-based, cord-impressed storage pot.

Thus, in conclusion, although it has not been possible to present every significant phase of the Abbott Site, and in spite of the fact the complete working out of the material may show minor differences, the following points in summation will probably hold true:

1. The culture on the Abbott Farm was homogeneous and of no great antiquity, the artifacts falling into a normal frequency curve with the peak a few inches below the plow line, and showing but little difference in typology and material from the lowermost depth to the surface.

2. Pottery was an integral part of this culture.

3. There is no justification for an "argillite" culture as a separate entity.

4. The material had not been moved after original deposition.

5. This component is typical of other central New Jersey sites, the main differences being that the Abbott area was more densely populated and that more excavating was done here, the larger series of remains filling in gaps, thus making negative evidence unnecessary.

6. The greater part of the material fits into the Red Valley Focus of the Coastal Aspect, scattered remains more typical of other aspects being well integrated in the culture as a whole with little or no temporal implications.

7. All of the above would seem to indicate that related cultures of the Eastern area are not very old, and that those identified with certain of the early aspects are separated from each other by little or no difference in time.

THE AZTECS
THEIR CULTURAL AND HISTORICAL POSITION IN MIDDLE AMERICAN ARCHAEOLOGY

GEORGE C. VAILLANT

University Museum, University of Pennsylvania

(*Read April 23, 1942*)

THE Aztecs occupy a peculiarly important place in Middle American archaeology, not only because their customs are known in greater detail than is usually the case for American Indian tribes, but also because the influences affecting their cultural position had a singularly significant bearing on the general trend of the civilizations developed in Middle America.

A definition of terms will be useful. The word Aztec or Aztecs may be well defined as a generic term covering the tribes that shared such religious practices, social organization, and arts and crafts as were current in central Mexico between the years 1300 and 1520. However, the political entities, which maintained this civilization, while struggling for their individual supremacy or survival, should be distinguished by the tribal names of their city states. In other words, the inhabitants of Tenochtitlan, the most famous representatives of Aztec culture, should be referred to as Tenochcas, not Aztecs, since their neighbors and predecessors, the Texcocans and Culhuas, had established Aztec civilization over a century before the Tenochcas had obtained anything like a permanent and important status in the Valley of Mexico.

The reconstruction of Aztec civilization falls into three broad divisions, each resting on a distinctive method of approach involving different intellectual formulae. First and foremost are the data accumulated from archival material derived from Spanish, evangelized Indian, and pre-conquest Indian sources. Second is the mute testimony of the autochthonous archaeological remains. Third is the analysis, based partly on observed social practice and partly on archaeological evidence, of the influence and support of this culture in terms of the history of Middle American civilization.

No other ancient culture of the American continents, hitherto studied, possesses these three categories of data developed to such a degree that each reinforces and supplements the general picture. The historical sources comprise an imposing body of native picture manuscripts either written prior to the conquest or copied in the early decades of the colonial period. Much of the verbal lore that was handed down to supplement the crabbed texts has been also recorded in early colonial times in Spanish and Nahuatl texts written in European calligraphy. Furthermore, a tradition of scholarship maintained for 420 years without a break enlightens and analyzes these basic texts, affording an exceptionally fine critical basis for testing interpretations. The archaeological record is less imposing, although research on the large monuments and great sculptures has been going on for a century and a half. Modern archaeological techniques, using every scrap of evidence to formulate historical interpretations, have been applied to research on a few sites for little more than a generation. The impact of the Aztecs on their neighbors must be gauged in terms of this type of research, although the myths of both the Aztecs and the contiguous tribes offer tantalizing suggestions.

The nature of these basic materials affects the close integration of the development and spread of Aztec civilization. From the manuscripts we have accounts of immigrant groups, of jejune empires, and of conquests—events which are sometimes set forth with that flauntingly optimistic lack of perspective characteristic of local historians. Such data need corroboration from some other sources. Archaeology furnishes such testimony in terms of the ruined architecture, broken pottery, sculpture, and utensils of stone, bearing witness to the actual presence of peoples who stayed in a locality for a long enough time to manufacture and leave behind them traces of their presence. However, only under exceptional conditions could such remains reflect such historically significant happenings as the passage of a migrating tribe, a sudden foray, or the intellectual influence of an individual upon his fellows.

Nonetheless, in spite of a broadly similar ethno-

logical foundation, the native religion was highly organized and ritualized. The tribes of Middle America seem to have had the practice of absorbing by the process of syncretism the gods of their neighbors. Furthermore, it is no exaggeration to say that the emphasis of Middle American civilization was on religion, so that intertribal contact, the passage of ideas, political domination, may be reflected in the imperishable objects of ceremonial use that may have survived the passage of time.

To fix better the position of Aztec civilization, a rough historical review will not be superfluous. Five great eras or culture stages seem to span the history of Middle America. For the first two of these stages we have no data. No traces have yet been found of the original hunting and gathering groups who populated the Americas, nor of the peoples who later succeeded in making the first steps into agriculture and achieving thereby a sedentary life.

The level at which we first observe man in Middle America is that of the so-called Archaic Cultures, better named Middle, since they reflect a stage midway between hunting cultures and the evolved theological civilizations of later times. The Middle Cultures were created by groups who occupied permanent villages for long periods of time, and, although stylistic differences assume considerable importance when opposed to the general uniformity of material equipment, the broad outlines of the pictures disclose a technical unity.

A kind of golden age supplanted this third era. To the equipment of the sedentary agriculturalists of Middle Culture times was engrafted a highly ritualized community religion, involving the building of temples, the creation of a pantheon, the use of a calendar, and sometimes two, one for almanac purposes, the other for recording the lapse of the seasons. As a concomitant some sort of writing or definitive symbols were developed as well. We must assume that these elements were not simultaneously obtained or invented, but rather were evolved one by one and passed about with modifications from tribe to tribe. As a corollary to this cohesion in religious practice and experience, we notice a highly emphasized differentiation from tribe to tribe, in the art styles, the names of the gods, the character of the writing, and the architectural forms. We have every reason to believe that, in spite of the common basic components of this religious civilization, the individual communities were very different in speech, in politics, and in intellectual background.

We are not in a position as yet to calibrate these stages in terms of absolute time. In spite of the great advances that have been made in studying the relationship between culture sequences and their interpretations in terms of Christian chronology, we cannot trace or localize the initial steps through which such elements as calendars, pantheons, and religious ceremonies evolved. We do know that there was a long period of contemporaneity, wherein such great Indian nations as the Maya, the Zapotecs, the so-called Olmecs or creators of the La Venta culture, and the Teotihuacanos or Classical Toltecs worked out their destinies.

Nevertheless, we must realize that the evaluation of contemporaneity is one of the most resistant barriers to the historical analysis of pre- or sub-literate people. At best one's time scales in terms of material culture are no more finely graded than in terms of centuries. The vast reaches of time encompassed in the eras of palaeontology and to a lesser degree prehistory in the palaeontological sense have perhaps tended to blunt our perceptions as to the importance of short units of time in human history. To illustrate this point, conceive of what a distorted picture one would have of the evolution of human culture, if one grouped all the events in Western Europe and the Americas between 1700 and the present day into a single era and described those social and material phenomena as contemporary!

Yet in just such a space of time, roughly speaking, one sees the gradual scaling off of the old artistically independent cultures and their replacement or modification by others which seem to be characterized by a common theology. It is in this period of transition from the fourth to the fifth of the broad culture phases of Middle American history, that the Aztec civilization gradually spread its mantle over the Valley of Mexico. In this period of social, political, and religious transition we find two groups of peoples, one rude savages, the other civilized dynasts accomplishing the downfall and the laying waste of the Teotihuacan culture. The process may be seen down to such fine details as spindle whorls or designs on clothing, as to just how the Aztec civilization spread west and north through the entire Valley of Mexico and up the Valley of Teotihuacan. By the same methods we can trace the lines of origin back to the east to the great plains of Puebla, where more finely and intricately made prototypes offer parentage to the sculpture, ceremonial vessels, and manuscripts of the Aztecs.

In scanning the documentary background of

this archaeological era, we derive an impression of a rapidly growing population which fills up its arable land, driving a surplus out to seek new territory. We seem to find hints that these people were forced to modify a basically agricultural religion to create a war-cult, essential to a reconciliation of divine blessing with the military hazards attendant on their efforts toward expansion. This last phase seems to have been an adventurer's era.

Far to the northwest on the borders of Sonora and Sinaloa in western Mexico, we have evidence of contact in the shape of ceremonial vessels, accurate replicas of forms made in central Mexico; but in the intervening zones there is no trace of passage. Far to the northeast in the mounds of Georgia, Alabama, and eastern Oklahoma, we find ceremonial designs suggesting the passage of a few of these hardy migrants. Along the coast of Vera Cruz as far north as the region of Tampico there is evidence of Aztec influence on the religious equipment, although the standard household forms seem not to have been much influenced. In Oaxaca again the religious aspect of this cult defines the closing phase of the Zapotec civilization of Monte Alban.

The religion of the conquerors apparently was absorbed, but the material culture was not entirely transmitted by those speaking the language of central Mexico.

Even the highly evolved and homogeneous civilization of the Maya seems to have been deeply affected by this pressure and we have a repetition of the annals of central Mexico in the stories of the Mexicans who came to Yucatan and supplanted the dynasty of the Itzas. There are temples on the east coast of Yucatan and at Chichen Itza that relate to central Mexico, not the final Aztec evolution as seen by the Spaniards, but an earlier phase which may have been the first introduction of these traits to the central valley. On the highlands of Yucatan this influence is more marked, and in the annals there are tales of people who come from Tollan, the home of the Toltecs, and once more the repetition of the replacement of dynasties occurs.

Government and religion were hardly distinguishable in these Indian cultures. Therefore conquest and conversion may well have been familiar when the country was evangelized in Spanish times. Beyond the borders of the Maya country in Salvador, Nicaragua, and the highlands of Honduras there are isolated groups of Nahua-speaking people and evidences of the existence of a central Mexican calendar, of ceremonial vessels, and of representations of the rain god, Tlaloc, all of which suggest that infiltrating groups had passed through densely occupied territory into less thickly settled regions beyond.

The tenth to the twelfth centuries seem to have been highly significant in American history, for we see that it is an era of upheaval and wandering. In the Southwestern United States consistent migrations among the Pueblo and Hohokam led to profound changes in areas of settlement. In the Southeast the present data would indicate that the old burial mound cult was replaced by that of the ceremonial platform and Mexican cult practices. In Mexico, as I have sketched, there was the terrific resurgence of that civilization which culminated in the Aztecs and their neighbors. The effect on the Maya may possibly be seen negatively rather than positively. At this time the great Maya cities of the Peten with their distinctively stela cult may well have been abandoned, although the question of the correlation of the Maya and Christian calendars has not yet been settled definitely. It is curious also that far to the south in Peru there occurred an analogous upheaval. The evolution of the Inca Empire, which was an empire of physical rather than spiritual domination, nipped off the politically independent groups with differentiated art forms like the Tiahuanaco in the north and the Nazca in the south. Whether this occurrence synchronized with events in the north cannot be postulated as yet.

There may have been earlier transformations of the same character in the New World; in fact, there is every evidence that the beginning of the religious civilizations in Middle America was something of the same sort, but the accompaniment of such transformation with movements of people is extremely interesting, especially when in both North and South America one has impressions of similar great dislocations of population.

Thus it may be seen that the Aztec period is an important one in American Indian history, owing to the reflections it gives of mighty events affecting human destiny. However, the Aztec period is likewise useful as a laboratory, where it is possible to test in terms of the documentary evidence of the formal historian those formulae which symbolize the history of pre-literate people and serve as the principal medium of the archaeologist. The Aztec period focusses on problems in social dynamics the light cast by such varied disciplines as archival history, sociology, ethnology, and archaeology.

THE POSITION OF CHAVIN IN ANDEAN SEQUENCES

WENDELL C. BENNETT

Yale University

(*Read April 23, 1942*)

The Problem

Since the beginning of the century the major outline of Andean chronology has been based essentially on the extensive excavations by Max Uhle (Uhle, 1902; Bennett, 1935; Kroeber, 1926*c*). Much of the work that has followed has refined the Uhle classification and added other details, but has not made any major changes. The Uhle outline was based on the concept of two pan-Peruvian periods: the Inca period, which had spread throughout a major portion of the Andean region at the time of the coming of the Europeans; and the earlier Tiahuanaco period, which had a somewhat more limited distribution from the home site in Bolivia, thence up and down the coast and highlands of Peru, and into Argentina, Chile, and Ecuador. Uhle isolated materials on the Peruvian coast which were earlier than this Tiahuanaco period: the Proto or Early Nazca on the south coast of Peru; and the Proto or Early Chimu on the north coast. These he called the *"Early"* periods. He next noted that the Tiahuanaco period broke down into a number of local styles (Uhle, 1903), although without totally losing their identity, and these he grouped together with the Tiahuanaco as the *"Middle"* periods. Finally local styles were found to intervene between the *Middle* periods and the Incaic—such as the Ica style on the south Peru coast, and the blackware Chimu style on the north coast—and these he called *"Late"* periods. The sequence was, then: Early local; Tiahuanaco middle; Late local; and Inca. A major part of the archaeologists who have followed Uhle have been able to fit their finds into this general series.

The extensive and important area of the north highlands of Peru was studied but casually by Uhle. Consequently, the styles known as Recuay and Chavin were not given a prominent place in the Uhle sequence, largely because the little that was known about them, Chavin especially, seemed just another manifestation, albeit an elaborate one, of the Tiahuanaco spread.

The extensive work of Julio C. Tello (1923, 1929), supplemented more recently by that of other scholars, has demonstrated beyond any question that Recuay and Chavin are both distinctive styles, not merely local variants, and that both deserve a prominent position in the Andean chronological framework. Furthermore, the recent discoveries by Julio C. Tello, Rafael Larco Hoyle, Gordon Willey, John H. Rowe, and others, show that the Chavin style itself is not limited to the north highlands, but appears as an isolated style or a design influence throughout most of Peru. The ramifications are great and do not present a consistent picture, so that we cannot simply add one more position to the Uhle sequence and let it go at that. In fact, what to do with Chavin is one of the major subjects of discussion among Andean archaeologists at the moment.

It is my purpose in this paper to review the Chavin problem briefly and to suggest some tentative conclusions, although much of the evidence has not been published, and some of the most important work is still going on. None the less, the problem is of sufficient importance for review.

The Chavin Site

The ruins of Chavin de Huántar, after which the style and the period are named, are situated to the east of the Cordillera Blanca on a small tributary of the Marañon River. It is not certain that the site of Chavin represents the center of development and distribution of the style. It may in fact represent but one manifestation, but up to the moment it is the most distinctive and most elaborate manifestation, and so it seems logical as a starting-point. The ruins are extensive and present a distinctive architectural style, a distinctive series of stone carvings in association, together with a definite stone-carving design style, and a typical ceramic complex with its own design style. The following résumé is based on the work of Tello (Tello, 1923, 1929; Bennett, 1939; Roosevelt, 1935) and on my own excavations at the site in 1938.

The ruins show basically stone construction

with a facility of handling large stones. While a detailed discussion of the architecture cannot be given, a few characteristics can be mentioned.

1. Symmetry in plan. The remaining constructions are largely of platform mound type which are laid out in a fairly symmetrical plan around a large square sunken court. The court faces the river, and is flanked on each side by a platform and backed by a large platform or temple called the "Castillo." Even the interior arrangement of galleries within the platforms tends to be symmetrical.

2. Mass effect is achieved in the building style, with little to break the monotony of a solid stone platform appearance.

3. An elaborate system of interior galleries, small rooms, and ventilation shafts is a feature of the platforms. The main "Castillo" has three floors of galleries connected by ramps and stairways.

4. Dressed stone blocks and slabs form an exterior facing. The galleries are walled and covered with split stone, and a rough rubble fill is in between. The dressed blocks are laid in horizontal rows, usually alternating thick and thin.

5. The "Castillo" has a projecting cornice of carved stone slabs, under which is a row of projecting stone-carved heads on tenons.

The architectural complex is unique. Other sites with Chavin style material do not present these features. Tiahuanaco site in Bolivia is sometimes compared (Means, 1931) but aside from dressed stone and carved heads on tenons there are few specific parallels.

Stone carving is essentially of two types: heads carved in the round and representing humans and felines; and flat carved slabs in which the carving is done via incision and champlevé rather than in high relief. Stones carved in this fashion are apparently limited to the Chavin site, but the carving design style has a wide spread and is the best means of identifying Chavin. The style is based almost exclusively on the feline concept, stylized, elaborated, and modified. The feline is represented in profile, head alone, and in anthropomorphized front view. Other features may be added, suggesting condors or snakes but without eliminating the feline. Design detail, which is usually abundant, is again derived from the feline figure. Common details are feline heads in profile, top view, and front view. The flamboyant, curvilinear style with the feline details is distinct from any other in the Andean region. Some of the details may be found in Tiahuanaco carving, but the style is distinct.

No cemetery or burials of this period were found at the Chavin site itself, but a large collection of potsherds can be identified definitely with the ruins. The wares are dominantly monochrome, with black, brown, or red most frequent; there are also a few fragments of black and red painted ware. Variation on an open bowl with thick rim and flat or rounded base is the commonest shape. Some fragments represent constricted collar jars, and a few may possibly represent stirrup-spout vessels, although the latter are not frequent. The decorated fragments show a simple, geometric style of circles, squares, triangles, straight lines, cross-hatched areas, and the like. Most design is by incision or punch with some appliqué strips and relief work. A few fragments have designs like the more elaborate stone-carving style, but in general the ceramics can be described as simple although technically well made.

Excavations at Chavin itself have so far shed little light on the ultimate chronological position of the period. The architectural, carving, and ceramic styles are definitely associated as the earliest material yet found. Post-Chavin material is for the most part not distinctive. A variant "Inca" style appears in a late position. Virtually no pieces can be classed with the Tiahuanaco Middle period, although such material is extensive in the north highlands. The distinctive Recuay style was not encountered in my excavations, although it is found in neighboring villages, and its center seems to be the Callejón de Huaylas over the Cordillera to the west of Chavin. In fact, the relationship of Chavin and Recuay is still unsolved.

The discovery of some intrusive graves in the Chavin levels may eventually be important. The graves contain a White-on-Red style pottery which may be related to the ceramics found by Uhle on the coast of Peru in Chancay Valley (Kroeber, 1926*b*). Notes from Gordon Willey, who has been excavating in Chancay recently, indicate that the W-on-R there is definitely pre-Tiahuanaco Middle period. If the W-on-R at Chavin can be correlated with the Chancay material, real antiquity is implied for the ruins of Chavin.

Distribution

The best evidence for the distribution of Chavin style has come from the coast of Peru. Tello

mentions a number of sites in the highlands where he has found Chavin material, but none of his evidence has yet been published. The Callejón de Huaylas, actually the upper extension of the Santa River, lies between Chavin site and the coast of Peru. One would expect to find evidence of Chavin in this region, but so far only a note from Tello indicates its presence. My own excavation in the region of Huaraz in the Callejon failed to produce even a suggestion of Chavin.

The coast of Peru, however, now has numerous Chavin sites, a few of which are mentioned here to indicate the nature of the problem.

1. *Ancon Shell Heaps*

Near the famous cemetery of Ancon, Uhle found a refuse site without burials, architectural features, or any other indications of an elaborate settlement. None the less, the ceramic fragments which he found there differed from the material of the large cemetery and are now seen to be identical with the Chavin ceramics, in ware, shapes of vessels, simplicity and technique of design style. Strong (1925) analyzed the Uhle Ancon collections and concluded that the refuse site material must be the oldest. The recent work of Willey has enlarged the collection of fragments and demonstrated that more elaborate decoration occurs, but has not materially changed the conclusions.

2. *Puerto de Supe*

Uhle's excavations at Puerto de Supe (Kroeber, 1925*b*), confirmed recently by Willey, uncovered burials, baskets, nets, textiles, and other miscellaneous objects. No stone carving nor architectural features were associated, but again the ceramics are closely related to, if not identical with, those at Ancon and Chavin. It is somewhat surprising that so far the closest ceramic associations of Chavin site are with these relatively poor Ancon and Supe sites. In both of these coast sites the material appears old, but only by inference, not by stratigraphy.

3. *Nepeña*

In 1933 Tello uncovered two sites in Nepeña Valley which added greatly to the Chavin picture (Means, 1934*a*, 1934*b*). One, Cerro Blanco, was a low building unit containing a clay platform carved into a Chavin-style feline head. Room walls of split stone and conical adobes had been covered with a clay plaster and carved with typical Chavin stone-carving designs and then painted. The second site, Punguri, likewise had conical adobes and clay plaster walls with carved Chavin design. Blackware ceramics with curvilinear incised design were associated. This second site, although clearly related to the first, had a painted fresco in a number of colors, with a design which, if the newspaper illustrations were correct, was not of Chavin style. On the other hand, the fresco cannot be regarded as related to any other known style.

At Punguri there was some suggestion of stratigraphy, with the Chavin material older than an Early Chimu, but this has not been finally confirmed. Nepeña Valley, then, presents Chavin-type sites with a new architectural style, including conical adobes, carved clay walls, and clay columns. More excavation is needed in Nepeña to solve these problems.

4. *Cupisnique*

In a dry quebrada off Chicama Valley, Rafael Larco Hoyle (Larco, 1938; Bennett, 1939) encountered many surface fragments with designs clearly related to those of the Chavin stone carving. The colors of the wares are similar to Chavin ceramics, but the designs seem more elaborate and the stirrup-spout shape is far more abundant. Other surface material included Early Chimu and Late Chimu fragments, but one can hardly speak of significant association in a quebrada of this type. The Cupisnique ceramics mark a style similar to but differing from Chavin ceramics. Chief differences are dominance of stirrup-spouts and elaboration of design in the direction of Chavin stone-carving style. Local collections from Chicama Valley show a number of complete vessels in this same style.

Since 1939 Rafael Larco (1941) has added immensely to our knowledge of Chavin. At some six different sites in Chicama Valley, center of the Early Chimu culture, he has found over 50 graves containing this Chavin-style material. These graves are rather crudely made pits with flexed or extended burials covered with red paint. One or more vessels of typical Chavin-design style are found in each, as well as gold objects, stone, bone, and shell, all decorated in Chavin stone-carving design style. In no grave has any other type material been associated, and several

stratigraphic sequences indicate that Chavin is older than Early Chimu.

At El Salinar, in Chicama Valley, Larco found a three-grave-level stratigraphy, with three typical Early Chimu graves at top, and a grave below with a new type material, which in turn cut through an old Chavin grave. His sequence is, then: Cupisnique (Chavin)—El Salinar (the new type material)—Early Chimu. This is doubly interesting because some of the Salinar material seems, from the few illustrations, to be related to the Chancay White-on-Red style already mentioned as post-Chavin at the highland site, and definitely "Early" period at Chancay.

5. *Other Sites*

To list other sites briefly, an isolated Chavin-style grave has been found in Viru Valley (Larco, 1941). At Chongoyape in Lambayeque Valley two isolated finds were made about 1930, one containing gold objects with Chavin design; the other containing similar gold objects plus two blackware vessels of the Cupisnique Chavin style (Lothrop, 1941). In Piura Valley an isolated vessel of this style was found years ago (Means, 1931). In Casma Valley, Dr. Tello discovered two sites with Chavin-style ceramic fragments, and one site with a retaining wall with carved figures. The carving is not Chavin, but seems distantly related. John Rowe found a pre-Inca layer at Cuzco, for the first time, and the monochrome incised ceramics recall the Chavin manner. Chavin influence appears in the pottery of Paracas on the south coast of Peru (Tello, 1929).

Tentative Conclusions

First, in respect to time chronology all evidence now points to a considerable antiquity for the Chavin material in spite of the ornateness of the style. The Larco evidence in Chicama with isolated graves, lack of other associated material, and grave stratigraphy indicates that Chavin is pre-Early Chimu. The suggestion of stratigraphy at Nepeña is substantiated by these finds. The evidence from Ancon and Supe, while not stratigraphically validated, is none the less best interpreted as indicating Chavin as the earliest period. The cross relationship of the W-on-R style at Chancay, Chavin, and El Salinar is likewise convincing. Other associations of Chavin style are with known early periods, such as Paracas, and Early Chimu at Moche (Kroeber, 1925*a*, 1926*a*; Uhle, 1913) (where Early Chimu manufactured pieces were found with definite Chavin design).

Second, Chavin is more than a simple unit period. At least two ceramic styles are indicated: one, relatively simple, at Chavin itself and also at Ancon and Supe; the other at Cupisnique and elsewhere which adds the ornate stone-carving designs. Chavin itself, with its special architecture and abundant stone carving, must be correlated with the conical adobe and rough stone construction of the coast. The differences are greater than those dictated by environment and preservation factors.

Third, Chavin as a style, and probably as a period, is widespread (from Piura on the far north coast to Paracas on the south coast; from Chavin in the north highlands probably to Pucara in the south highlands).

The dominance and distinctiveness of Chavin style, the antiquity, and the known wide distribution definitely suggest that we must add still a third pan-Peruvian period to the Uhle sequence in Andean chronology.

References

Bennett, Wendell C. 1935. Archaeological Peru. *Sci. Monthly* **41** (4): 305–315.

——. 1939. Archaeology of the north coast of Peru. *Anthropol. Papers Am. Mus. Nat. Hist.* **37**, part 1.

Borchers, Philipp. 1935. Die weisse Kordillere. Berlin.

Kroeber, A. L. 1925*a*. The Uhle pottery collections from Moche. *Univ. California Publ. Am. Archaeol. and Ethnol.* **21** (5): 191–234.

——. 1925*b*. The Uhle pottery collections from Supe. *Univ. California Publ. Am. Archaeol. and Ethnol.* **21** (6): 235–264.

——. 1926*a*. Archaeological exploration in Peru, part I. Ancient pottery from Trujillo. *Field Mus. Natural Hist. Anthropol. Mem.* **2** (1).

——. 1926*b*. The Uhle pottery collections from Chancay. *Univ. California Publ. Am. Archaeol. and Ethnol.* **21**: 265–304.

——. 1926*c*. Cultural stratification in Peru. *Am. Anthropologist* **28**: 331–351.

Larco Hoyle, Rafael. 1938. Los Mochicas. Vol. I. Lima.

——. 1941. Los Cupisniques. Lima.

Lothrop, S. K. 1941. Gold ornaments of Chavin style from Chongoyape, Peru. *Am. Antiquity* **6** (3): 250–262.

Means, Philip Ainsworth. 1931. Ancient civilizations of the Andes. New York.

——. 1934*a*. Des commentaires sur l'architecture ancienne de la côte péruvienne. *Bull. Soc. Américanistes Belgique* no. 14: 75–110.

——. 1934*b*. New clews to early American culture. *New York Times Magazine*, Sunday, May 20, p. 12.

ROOSEVELT, CORNELIUS VAN S. 1935. Ancient civilizations of the Santa Valley and Chavin. *Geog. Rev.* **25** (1): 21–42.

STRONG, W. D. 1925. The Uhle pottery collection from Ancon. *Univ. California Publ. Am. Archaeol. and Ethnol.* **21** (4): 135–190.

TELLO, JULIO C. 1923. Wira Kocha. *Inca* **1**: 93–320, 583–606.

——. 1929. Antiguo Peru. Lima.

——. 1937. El Strombus en el Arte Chavin. Lima.

UHLE, MAX. 1902. Types of culture in Peru. *Am. Anthropologist* **4**: 753–759.

——. 1903. Pachacamac. University of Pennsylvania, Philadelphia.

——. 1913. Die Ruinen von Moche. *Jour. Soc. Américanistes Paris*, n.s., **10**: 95–117.